THE

AMERICAN DISPENSATORY.

BY

JOHN KING, M. D.,

PROFESSOR OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, IN THE ECLECTIC COLLEGE OF MEDICINE, CINCINNATI; FORMERLY PROFESSOR OF THE SAME IN THE ECLECTIC MEDICAL INSTITUTE, OF CINCINNATI; OF MATERIA MEDICA, THERAPEUTICS AND MEDICAL JURISPRUDENCE, IN THE MEMPHIS INSTITUTE; AUTHOR OF AMERICAN ECLECTIC OBSTETRICS, WOMEN, THEIR DISEASES AND TREATMENT, ETC., ETC.

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TO

ALL TRUE FRIENDS

OF

LIBERAL AND PROGRESSIVE MEDICINE

THROUGHOUT THE UNION,

THIS WORK

IS RESPECTFULLY INSCRIBED,

BY

THE AUTHOR.

ABBREVIATIONS.

THE principal Abbreviations employed in the work, both where credit is given or for other purposes, are as follows:

Nat. Ord.	Natural Order.
Sex. Syst.	Sexual System of Linnæus.
B.	Bigelow's "*Veg. Mat. Med.*," and "*Am. Med. Bot.*"
Bar.	Barton's *Veg. Mat. Med. of the U. S.*
C.	Christison's Dispensatory.
Coxe.	Coxe's Dispensatory.
D.	David Don. "*Linn. Trans.*" and "*Philos. Magazine*," etc.
De. Cand.	De Candolle, "*Essai sur les Propr. Med des Plantes*," etc.
Dub.	Dublin Pharmacopœia.
Dunc.	Duncan's Edinburgh Dispensatory, 1830.
E. & V.	Edwards & Vavasseur, "*Manual of Mat. Med*," translated by Togno & Durand.
Ed.	Edinburg Dispensatory.
G.	Gray's "*Botany of the Northern States.*"
J. K. or *K.*	Prof. John King, M. D.
L.	Lindley's "*Med. Flora.*"
Lond.	London Pharmacopœia.
N.	Nuttall.
Off. Prep.	The Officinal Preparations described in this work.
P.	Pereira's "*Mat. Med. and Therap.*"
R.	Rafinesque's "*Med. Flora.*"
Ro.	Roxburgh, "*Fl. Ind.*"
Sp. Gr.	Specific Gravity.
T.	Thomson's "*Chemistry of Organic Bodies*," and "*Inorganic Chem.*"
T. V. M.	Prof. T. V. Morrow, M. D.
Tur.	Turner's Chemistry.
W. S. M.	Wm. S. Merrell.
W.	Wood's "*Class Book of Botany.*"
W. I.	Wight and Arnott.
Wi.	Willdenow "*Sp. Plant.*"
Witt.	Wittstein's "*Practical Pharmaceutical Chemistry.*"
W. & A.	Wight and Arnott.
Wo.	Woodville's "*Med. Botany.*"

PREFACE.

It may not be known to some of the readers of this work, that a great amount of highly-important knowledge, in reference to the therapeutic value of remedies, and especially of our native American plants, has been accumulated by liberal-minded physicians in America; which knowledge, owing to various causes, has never yet been sufficiently brought before the medical profession generally, and has not been embodied in the voluminous standard works of Pereira, Dunglison, etc. This knowledge, being especially American in its origin, and having produced a marked peculiarity in the practice of a large number of American physicians, it is deemed proper to style this work, the "American Dispensatory," to distinguish it from other works, which contain only the ideas or views which are common to those pursuing the European or "Old-School practice," as well as from the former Dispensatories by the author.

Another urgent reason for the publication of this work existed in the fact that the important improvements and discoveries of American or "New-School" physicians have not only been, to a great extent, overlooked by authors, but have already found their way into medical works, without any reference whatever to their paternity; and, in some instances, articles familiarly known and used for twenty years past by Medical Reformers have been gravely brought forward as new discoveries.

Among the liberal and progressive physicians of this country are a class who have been termed "American Eclectics," and to which the author of the present work is attached. The term ECLECTIC as thus used, implies something more than what we usually associate with that word as a common adjective. It refers to the existence of a large class of physicians in America, who believe that the profession has been too much trammeled by the influence of authority, and by the disposition to impose upon the younger members of the profession certain scientific and ethical doctrines which their seniors have sanctioned; thus reducing a noble profession, with a comprehensive science, to the character of a *sect*, with certain cherished *dogmas*. AMERICAN ECLECTICISM is thus opposed to medical SECTARIANISM, and especially to that most oppressive form of sectarianism, which, like the Roman Hierarchy, denying that it is *sectarian*, assumes to be an embodiment of unquestionable truth, and pronounces the medical system which may be sanctioned by the majority of the present generation, a standard of scientific truth, from which any deviation, or even the expression of dissent, should be condemned and punished by professional and even social ostracism.

This assumption of infallibility in the existing and prevalent system of therapeutics, or rather, of the right to enforce its acceptance, by dishonoring all who dissent from its doctrines, is too extravagant to bear the test of serious examination. No one who is familiar with medical history, who recollects the incessant changes in medical doctrines and practice from the days of Galen's infallibility to the present time, and who remembers how sternly the main body of the profession have rejected and condemned the doctrines which their successors were compelled to adopt, can suppose that a profession, so very fallible in all past time, has even yet acquired infallibility; nor can any one seriously believe it, when he observes in the doctrines and practice of the present day the same slow, steady, progressive change as in past times. And if the idea of doctrinal infallibility as to Therapeutics, either in the mass of the profession or in its most gifted leaders, be, in fact, too absurd for serious argument, what possible foundation can there be for the assumption that truthfulness and professional repectability belong exclusively to the majority, and to their transitory doctrines, and that any different scientific doctrines should be branded as empirical and disreputable?

Such assumptions, being essentially absurd and groundless, are based now, as they always have been, on that arrogant and intolerant element of human nature which leads all large masses of men to attempt to enforce conformity to their own sentiments, and to dishonor all who oppose them—as an Egyptian rabble hoot at a passing Christian. The liberal and humane spirit of the age is opposed to such intolerance, and demands that sectarians in theology and in science shall extend mutual toleration to each other.

This toleration is demanded not only by sound morals, by the spirit of humanity and the amenities of social life, but by justice to truth; for as no sect or doctrine can be based exclusively upon falsehood, and as it is certain that whatever has been received by any considerable number of men must contain an appreciable amount of truth, true philosophy dictates that we should receive and examine with candor all medical doctrines, not only through courtesy to their supporters, but for the sake of profiting by their truths. This duty is especially urgent when the supporters of such doctrines claim to have achieved much good by their medical practice; and if their claims are well-grounded, we should be culpable indeed, in neglecting to avail ourselves of the instruction which they proffer for the sake of humanity.

Those physicians who, in America, have been most zealous in maintaining these liberal principles, have generally been called "Eclectics," but they have equally found able advocates among the followers of Beach, Thomson, Hahnemann, Priessnitz, and other reformatory teachers of medicine. It is true that many physicians have contended that the whole profession should be Eclectic, and that some even maintain that it is at present Eclectic, and liberally examines or adopts whatever may be presented that is new and true. It is true that the entire profession is not *totally destitute* of the spirit of Eclecticism, for such destitution would imply a total destitution of liberality; but we can not recognize Eclectic liberality in those who treat with bitter scorn the personal and professional characters of scientific physicians whose doctrines differ from the more prevalent views of Therapeutics, and who, instead of recommending, endeavor to discourage or prevent, the free examination of what they consider heretical doctrines, and who attach professional penalties to the avowal of what they deem heretical sentiments. If the investigation of different medical doctrines is to be carried on under the threat of professional excommunication, unless certain conclusions are adopted, and if, as has been recently arranged in certain medical colleges, the young practitioner shall be entitled to hold his diploma only so long as he adheres to certain opinions, there is no more freedom of investigation conceded on medical subjects than there would be freedom of suffrage when the polls were overawed by the bayonets of one of the candidates.

In extending our personal courtesy and professional liberality to the followers of Thomson, Beach, Hahnemann, Priessnitz, and minor leaders of medical parties, we are merely obeying the positive dictates of morality and religion, which forbid unkind, illiberal sentiments; and as the time must come when all that has been developed by the labors of medical sectarians shall be incorporated with the established mass of recognized science, it is unwise and injurious to the progress of the profession to delay such incorporation by encouraging animosities and isolation among the cultivators of medical science.

Such is the kindly and harmonious spirit which American Eclectics desire to see introduced into the profession; but in addition to these ethical improvements, they desire a more faithful and prompt adherence to the dictates of *Clinical experience.* There are many changes in the details of medical practice, the value of which has been amply demonstrated by experience, in the various climates of the United States, but which have not yet been adopted by the profession generally, because they are not yet sufficiently known and understood by those who have not been pupils of the Eclectic Schools of Medicine. For the nature of these improvements, and their gratifying results in the treatment of disease, we must refer to the "American Eclectic Practice of Prof. I. G. Jones," as revised and improved by Prof. W. Sherwood, the "American Eclectic Obstetrics," as well as the work on "Women: their Diseases and their Treatment," by the author of the present volume, together with the forthcoming work on Surgery by Prof. A. J. Howe, and several other volumes of a valuable character by various authors.

For further information of the American Eclectic system, we would refer to the practice of American Eclectic physicians, and to the Lectures in their several Colleges.

The highest evidence of the value of American Eclecticism is found in the successful treatment of disease by American Eclectic physicians; in the treatment of 1,503 cases of cholera, in Cincinnati, in 1849, with a mortality of only 65, and many analogous facts, which will hereafter be more fully authenticated. These great practical improvements are simply the fruits of patient and faithful attention by numerous physicians to the results of experience, and the liberal spirit of American Eclectics, who have not disdained to gather knowledge from any source. We should not overlook, in our passing reference, the distinguished services of individuals who, if they were not like Hahnemann or Dixon, the authors of a special and exclusive theory of Therapeutics, have the more exemplary merit of faithful scientific observation in a liberal and candid spirit of improvement, and the honor of arranging and presenting before the public, with untiring energy and unshrinking moral courage, a mass of science much in advance of prevalent ideas, and consequently greatly embarrassed by the habitual, resolute opposition of conservative minds. We allude especially to the late Dr. THOMAS V. MORROW, to whose reputation as a practitioner, and untiring zeal as a medical professor, we are mainly indebted for the establishment and maintenance of those improvements and liberal principles in medicine so well known at the present day throughout the Union and in Europe, and which have led to the successful establishment of Eclectic Medical Colleges in Cincinnati and other cities. This reference to PROF. MORROW is especially demanded by the fact that so little has been left from his pen to bear witness to the value of his services as a medical teacher and pioneer laborer in medical reform and improvement. His distinguished co-laborers, Professors J. R. BUCHANAN and I. G. JONES, have already, by their pens, made known to medical readers their conspicuous agency in medical progress.

We are greatly indebted to Prof. BUCHANAN for his able and zealous services in maintaining the success, the reputation and unity of Medical Reformers, while at the same time he has been known as a peculiarly original and philosophic teacher of medicine, and most distinguished exponent of the philosophy of American Eclecticism.

To the late Professor I. G. JONES we are greatly indebted, as an early co-laborer of Professor MORROW, at Worthington; as an eminent and veteran practitioner; an able teacher of medical practice; and a successful author, whose writings will contribute much to the diffusion and adoption of the improved system of Therapeutics, the value of which has been so well displayed in his own practice. If the American Eclectic improvements in medicine are even one-half of what is believed by those who have personally tested them, they who have devoted their best energies and risked the entire loss of reputation for the sake of such truths, will be gratefully remembered by posterity, and the names of MORROW, BUCHANAN and JONES, with their coadjutors and successors in the labor of scientific reform, will be held in distinguished honor.

To this cause, the author of the present volume has been devoted for about twenty-four years as a medical practitioner, and, for several of the past years, as a medical professor and author, and he wishes no higher honor than to be recognized as one of those who, from the commencement of the American movement, have participated in the labors of its pioneers.

An important characteristic of American Medical Reformers, which may be illustrated by this volume, is the superior zeal displayed by them in making important and much-needed improvements in the Materia Medica, and especially in developing the medicinal value of our native plants. There are many results attainable in practice, by the use of these new resources, which could not be satisfactorily realized by the agents in ordinary use. One of these important results is the ability to dispense partially, if not wholly, with various unsafe or deleterious agents, and accomplish the purposes for which they are used by safer and more scientific treatment. We say more *scientific*, because that is certainly the most scientific prescription which accomplishes the object desired without incidentally inflicting unnecessary injury. The many inconveniences and dangers attending the use of mercurial medicines have produced a strong desire to find some safe and efficient substitute. There is no single remedy ever known to man which has produced a greater amount of mischief by its indiscriminate use than *Mercury;* nor is there any other drug which has done one-hundredth part as much to create a prejudice against scientific medicine, to destroy the confidence of the community in its practitioners, and to repel them from the physician to the nostrum-dealer. But with the mass of the profession, the desire to find a substitute for Mercury has been rather an idle fancy than a positive desire or purpose, and has produced no result whatever. Indeed, the conviction still prevails that no substitute for Mercury can be found; and we regret to record the fact, in the year 1858, that medical schools, and medical authors generally, still regard Mercury as the only powerful and reliable cholagogue, simply because they are not acquainted with the powers of other agents; the most specific cholagogue known, Leptandrin, not having obtained a place in any but the Materia Medicas and Dispensatories of American Medical Reformers, and Leptandra itself having been excluded from the U. S. Pharmacopœia, on account of its supposed worthlessness. Leptandrin, Podophyllin, Apocynin, and Iridin, with Sanguinaria, Taraxacum, Berberis, and Euonymus, and occasional combinations, of other articles, accomplish far more than Mercury performs, in the way of arousing the liver, affecting the secretions generally, and even producing salivation of a harmless character. It is not merely in substitutes for mercurials, and for various prescriptions which the physician uses with caution, and without entire satisfaction, that the improvement of the American Eclectic Materia Medicas consists, but also in the introduction of agents and powers of a novel character, or the extensive application of articles previously little known and seldom used. Of articles, previously little known or used by the profession, which are extensively used by the liberal and progressive medical men of this country, we may enumerate:

Achillea,
Actæa,
Adiantum,
Aletris,
Alnus,
Althæa,
Amaranthus,
Ampelopsis,
Apocynum,
Aralias,
Arum,
Asarum,
Asclepias,
Aster,
Baptisia,
Berberis,
Betula,
Bidens,
Buxus,
Capsicum,
Caulophyllum,
Ceanothus,
Celastrus,
Chelidonium,
Chelone,
Chimaphila,
Cimicifuga,
Clematis,
Cochlearia,
Comptonia,
Convallaria,
Corydalis,
Cypripedium,
Daucus,
Diervilla.
Dioscorea,
Epigæa,
Erechthites,
Erigeron,
Eryngium,
Erythronium,
Euonymus,
Eupatorium,
Euphorbia,
Frasera,
Fraxinus,
Galium,
Gelseminum,
Geranium,
Gerardia,
Geum,
Gillenia,
Hamamelis,
Helianthemum,
Helonias,
Heracleum,
Heuchera,
Hieracium,
Hydrastis,
Hypericum,
Inula,
Iris,
Jeffersonia,
Kalmia,
Leonurus,
Leptandra,
Liatris,
Ligustrum,
Liquidambar,
Liriodendron,
Lobelia,
Lycopus,
Lythrum,
Marrubium,
Menispermum,
Menyanthes,
Mitchella,
Monotropa,
Myrica,
Nymphæa,
Onosmodium,
Orobanche,
Osmunda,
Ostrya,
Pæonia,
Panax,
Parthenium,
Phytolacca,
Plantago,
Podophyllum,
Polemonium,
Polypodium,
Polytrichum,
Populus,
Prinos,
Ptelea,
Pteris,
Pterospora,
Pycnanthemum,
Pyrola,
Rhus,
Robinia,
Rubus,
Rudbeckia,
Rumex,
Sabbatia,
Salix,
Sanicula,
Saponaria,
Scutellaria,
Senecio,
Silphium,
Solidago,
Spiræa,
Spirit Vapor-Bath,
Stillingia,
Symphytum,
Trifolium,
Trillium,
Ulmus,
Urtica,
Uvaria,
Uvularia,
Verbascum,
Verbena,
Vernonia,
Viburnum,
Xanthoxylum.

Together with numerous others, not herein referred to.

It is true that a number of the foregoing articles have been referred to by medical writers, and a few have been occasionally used in practice, but in general, they have been located at the extreme verge of the visible horizon of the profession—in the outside regions of empiricism, unknown to the mass of physicians, and but slightly known to any who were not especially addicted to botanical pursuits. The honor of their introduction into regular medical practice belongs to the Medical Reformers of America, through whom their virtues have been made known; and by whom articles have been made prominent and important agents, in the Materia Medica, which were previously treated with so much contempt, that a physician felt almost ashamed to investigate their virtues, or acknowledge any acquaintance with them.

Of the above articles, or their concentrated principles, which are absolutely new, and at present confined to the circle of practice of Medical Reformers, by whom they were introduced, we may mention:

Aletridin,
Alnuine,
Ampelopsis,
Antennaria,
Apocynin,
Asclepias Incar.,
Asclepidin,
Aster,
Baptisin,
Bidens,
Buxus,
Caulophyllum,
Caulophyllin,
Ceanothus,
Ceanothine,
Chelone,
Cimicifugin,
Cornu cervinæ calcinatum
Corydalis,
Corydalia,
Cypripedin,
Diervilla,
Dioscorea,
Dioscorein,
Echinospermum,
Epigæa,
Equisetum,
Erechthites,
Erechthites, oil of,
Euonymus,
Euonymine,
Eupatorin,
Eupatorium Purp.,
Eupurpurin,
Galium,
Gelseminum,
Geraniin,
Gerardia,
Goodyera,
Helonine,
Hieracium,
Hierochloa,
Hydrastin,
Iridin,
Jeffersonia,
Juglandin,
Leptandrin,
Lobelia, oil of,
Menisperine,
Mitchella,
Monotropa,
Myricin,
Onosmodium,
Osmunda,
Ostrya,
Parthenium,
Phytolaccin,
Podophyllin,
Polemonium,
Polytrichum,
Prunin,
Ptelea,
Ptelein,
Pteris Atrop.,
Pterospora,
Pycnanthemum,
Rhusine,
Robinia,
Rudbeckia,
Scutellarin,
Senecin,
Sesquicarbonate of potass.
Silphium,
Spirit Vapor-Bath,
Stellaria,
Stillingia, oil of,
Uvaria,
Uvularia,
Vernonia,
Viburnum,
Viburine,
Xanthoxylin, and oil of,
Xanthoxylum, etc.

The extensive use of the foregoing articles, and their consequent substitution, on many occasions, for the favorite remedies formerly in use, constitutes a practical improvement, the value of which can scarcely be estimated, and the simplest statement of what we believe and know to be true, as regards the superior success in practice resulting from these improvements in the Materia Medica, would be regarded by those entirely unacquainted with the facts, as the language of extravagant enthusiasm. For their truth, however, we can but appeal to the final tribunal, *universal experience;* and it is partly with the view of facilitating this appeal by candid physicians, that this volume is laid before the public, in which, we trust, every medical reader will find sufficient information, in reference to the favorite remedies of American Eclectic physicians, to enable him to enjoy in practice what we deem the richest fruits of modern clinical experience, constituting the most recent and important practical improvements in the healing art.

For a knowledge of the improvements and peculiar principles of medical practice originating with the other reformatory practitioners, heretofore alluded to, the reader is referred to the various volumes which have emanated from their several writers; the matter in which should be carefully read and the facts and conclusions drawn therefrom fully investigated, by every liberal physician.

In the present volume will be found a thorough account of the numerous medicinal plants in use among the various classes of medical practitioners in this country, especially those more generally employed by Reformers, and many new and valuable remedies have been introduced, some of which are not described in any other work. The matter of a useful and practical character, contained in the former Dispensatories of the author, and which are now out of print, has been transferred to the pages of the present one; and to render the volume as thorough as possible, the mineral remedies of old-school practitioners, their properties and uses, etc., have been described in the Appendix, under the head of "Obsolescent Remedies." To render the work worthy the patronage of the entire profession, including druggists and pharmaceutists, no labor or expense has been spared in procuring such books from England, France, etc., as would contribute to augment the value of the work by supplying its pages with the various improvements and discoveries in medical science, up to the present day. It will be seen that the work is divided into three parts:

Part I. is devoted to the Materia Medica; the various plants are arranged alphabetically, and their Botanical characters are given with sufficient accuracy to enable the medical botanist to select and determine them when met with. The Natural and Artificial classifications of each are mentioned, together with the Vulgar names by which they are known in the different sections of our country. A brief reference is likewise made to their general history, with a statement of such Chemical relations and incompatibilities, medically considered, as will be necessary for practical purposes; and, as far as known, the Therapeutic influence of each agent is fully but concisely presented. Since the introduction of our new remedies, some of which were discovered and introduced to the profession by the author, as Podophyllin, Iridin, Cimicifugin, etc., a great improvement has taken place in American Eclectic treatment, and the successful results have been so well marked and undisputed as to have recently invited the investigation of the more liberal Old-School physicians; and it is with no little pleasure we state that already hundreds of them, notwithstanding arbitrary prejudices, are adopting our new remedies, and are gratified by finding them greatly superior to the agents for which they have been substituted.

Part II. is occupied principally with American Eclectic Pharmacy, and those Preparations only have been described, which an enlarged and successful experience has justly entitled to the rank of officinal; many others might have been mentioned, but further investigations are required to test their permanent utility. Indeed, the Pharmacy of American Eclectic Practice may be said to be almost endless, as a vast amount of agents, both simple and compound, are in constant use, which would require a volume equal in size to the present for their thorough consideration; and to select from these the more common and successful preparations has been a task of no ordinary labor. Our Resinoids, Oleo-resins, etc., which some might deem to be in their proper place only in this part of the work, we preferred to arrange in Part I., accompanying the history, etc., of the plants from which they are obtained. Decoctions and Infusions which are largely used in practice, have been briefly noticed, without any special list, although the general rules for their preparation are laid down; and wherever there is a departure from these in any articles required in infusion or decoction, it will be ascertained under the description of the article in Part I. In the numerous pharmaceutical compounds, the recent and most improved formulæ for their preparations are given.

In many of the chemical compounds, simples, etc., described in both Parts I. and II., the author has freely availed himself of the "Practical Pharmaceutical Chemistry," of Dr. G. C. Wittstein, of Germany, translated by S. Darby, of England,—a most excellent and valuable practical pharmaceutical treatise, which has not yet been presented to the American profession.

In the Appendix will be found an amount of selected matter of a valuable character, consisting of Obsolescent or Mineral Poisonous Agents; Medical Abbreviations and Latin terms; Tables of Weights and Measures; Specific Gravities; Solubility of Salts, etc., which will be of much utility to the Chemist and Pharmaceutist, and which, we hope, will prove acceptable to all.

The Index has been rendered as full and complete as possible, that no difficulty may be experienced in readily finding any subject contained in the work.

In scientific matters, to write a purely original work is out of the question; authors have to avail themselves of the information and discoveries promulgated by each other, and in the endeavor to present a complete practical knowledge of medicines, we have not hesitated to consult many excellent authorities; and though considerable information is introduced not to be had in other publications, yet the only originality claimed is the introduction of New Medicinal Plants; of Concentrated Remedies—their Preparations and Uses; of valuable and Officinal American Eclectic Pharmaceutic Preparations; the selection and disposition of the matter, and the endeavor to systematically methodize the hitherto crude material floating among New-School practitioners, as well as to rectify the irregular classification and nomenclature of many valuable remedies; thus preserving for Medical Reform the proper credit for that to which it is justly entitled. And as the liberal and progressive physicians of this country have, heretofore, from various causes, lost much of the credit to which they were justly entitled, it is hoped that this work, by a systematic presentation of their ample and original resources, may serve to secure the honor of medical improvements to their true sources.

The Botanical Descriptions of the various plants have been selected and arranged from the best authors, as—De Candolle, Lindley, Bigelow, Barton, Dr. David Don, Willdenow, Woodville, Wight and Arnott, Roxburgh, Rhind, Nuttall, Torrey, Rafinesque, Gray, Wood, etc. And to those practitioners who would become acquainted with the Botanical names and descriptions of new remedial plants, found growing in their neighborhood, I would especially recommend "Gray's Botany of the Northern United States," and "Wood's Class-book of Botany."

In the Historical, Chemica , Therapeutical and Pharmaceutical Departments, I am under considerable indebtedness to Thomson's Organic and Inorganic Chemistry, Duncan's Edinburg Dispensatory, the London, Dublin, and Edinburg Pharmacopœias, Christison's Materia Medica, Pereira's

Materia Medica, Edwards' and Vavasseur's Manual, Coxe's Dispensatory, Wittstein's Pharmaceutical Chemistry, Chemical Gazette, Bell's Pharmaceutical Journal and Transactions, Chemical Times, Mohr and Redwood, the American Journal of Pharmacy, together with many other valuable books and journals. The editor of the last-named journal, Professor Wm. Procter, Jr., has a high reputation, both in this country and in Europe, as a Chemist and Pharmaceutist, and to his scientific knowledge and ability, a voluminous compilation of similar character to the present work owes most of its value and popularity.

I am likewise under many obligations to Mr. Wm. S. Merrell, Dr. F. D. Hill, Mr. H. A. Tilden, and Professor E. S. Wayne, for several Pharmaceutical communications of a valuable character. The latter gentleman ranks among the best practical and theoretical Chemists in our country. Beside other matter, the article ón Cinchona was collected by him from various sources, and kindly furnished to me. I also return my thanks to those members of the profession who have imparted new and useful medical information, or who have in any way contributed to aid in the preparation of the work.

THE AUTHOR.

CINCINNATI, JANUARY, 1859.

PART I.

MATERIA MEDICA.

ABELMOSCHUS ESCULENTUS.

Okra.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

FRUIT.

Description.—This is an annual plant, known also by the name of *Gombo*, and is the *Hibiscus Esculentus* of some authors. The *stems* are somewhat woody toward the base, erect, branched, round, from three to six feet in height, and three to four inches in diameter. The herbaceous part is covered with sharp bristles, and often bears purplish spots. The *leaves* are alternate, petioled; the lower ones being angular, the central ones palmate, and the upper ones subdigitate, the divisions being lanceolate-oblong; all are serrate and somewhat bristly. The *petioles* are round, bristly, and as long as the leaves. The *flowers* are very large, axillary, solitary, on short peduncles, of a pale-yellow color, with a dark-crimson bottom. *Involucre* one, from six to twelve-leaved; *leaflets* linear, bristly, deciduous. The *calyx* spathiform, of a very soft texture, bursting lengthwise on one side; *stigmas* equal to the cells in the capsule. *Capsule* six to twelve inches in length, about one inch in diameter, somewhat bristly, especially the ridges, equal in number to the cells and valves, with a single row, of round, smooth seeds in each cell.—*L.*

History.—This plant is a native of the West Indies, and is also cultivated in the Southern States, where the capsule is much employed in soups, and for pickles. The capsule is the part employed, and abounds in mucilage. The *Hibiscus Abelmoschus*, or *Abelmoschus Moschatus*, so named from the musky fragrance of the small, reniform, striped, somewhat hazel-colored seeds; these have a pungent, aromatic flavor, and according to Lindley are used by the Arabians to mix with their coffee.

Properties and Uses.—Okra is mucilaginous, and may be employed whereever emollients and demulcents are indicated; an excellent softening and relaxing cataplasm may be made from the leaves. The seeds of *H. Abelmoschus* are said to be cordial, stomachic, and nervine. On account of their agreeable odor, they are much sought after by perfumers.

ABIES BALSAMEA.

Fir Balsam.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

JUICE OR RESINOUS EXUDATION.

Description.—This is a small, handsome tree, rarely above thirty feet high, and having a regularly pyramidal head. It is called, in some sections of the country, *Balsam Spruce*, *Hemlock Fir*, *Balm of Gilead*, etc. The *leaves* are half an inch or three quarters of an inch in length, evergreen, linear, obtuse, bright-green above, silvery-white underneath, with a grooved line above, and an elevated one beneath. The *male flowers* are yellow, numerous, axillary, solitary, and about as long as the leaves; the *female catkins* are lateral, cylindrical, erect, and green; the *bracts* obovate, tipped with a point, somewhat minutely toothed, shorter than the broad, compact *scales*. The *cones* are two or three inches in length, and about an inch broad, erect, cylindric, lateral, reflexed on the margin, shining, purplish.—*G.*—*W.*

History.—This tree is found growing in the northern portions of the United States, and in British North America, also in lower latitudes on highly elevated situations. The juice which is procured from this tree is known by the names of *Canada Balsam*, *Balsam of Fir*, *Canada Turpentine*, etc. It may be had by making incisions into the tree, but more generally, by collecting the fluid which is discharged from the bladders containing this oleo-resin which form between the wood and the bark. Canada balsam, when recent, has the spissitude of syrup, but gradually solidifies by age; at first it is usually clear, but gradually becomes of a deep yellowish color. It is strongly adhesive, has a peculiar, rather pleasant turpentine odor, and a warm, slightly amarous,* terebinthine taste. Moderately heated, it becomes more fluid; a higher heat gives off volatile oil, leaving behind resin somewhat empyreumatised. The same result takes place when boiled with water, and the remaining unevaporated water holds a little succinic acid in solution. It is readily inflammable, giving a dense reddish flame, and considerable black smoke. Alcohol does not completely dissolve it; ether and oil of turpentine dissolve it; and solution of potassa forms a soluble soap with a part of its resin. It has not been satisfactorily analyzed. According to Bonastre, Canada balsam contains 40 parts of resin soluble in alcohol, 33.4 of nearly insoluble sub-resin, 18.6 of volatile oil, 4 of caoutchouc, and 4 of salts, bitter extractive, and traces of acetic acid.—*Jour. de Pharm.* VIII., 337.—*P.*

Canada balsam is extensively used by persons engaged in microscopic

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**Amarous* means bitter.

investigations, as a cement, to impart a greater transparency to certain objects, and to preserve and mount objects. According to Pereira, it possesses right-handed circular polarization; but both the oil and resin obtained from it by distillation, have left-handed polarization.

Properties and Uses.—In large doses, Canada balsam acts upon the bowels, and is apt to cause nausea. In small ones it increases the urinary secretion, and also acts as a stimulant to the general system. Its vermifuge properties are inferior to those of the oil of turpentine. From its direct action on mucous tissues, stimulating them, it has been found a very efficacious internal remedy in gonorrhea, gleet, chronic mucous inflammation of the bladder, chronic laryngitis, bronchitis, catarrh, mucous diarrhea, hemorrhoids, and rheumatic affections. In gonorrhea, where the use of copaiba is not desirable, I have found the Canada Balsam an excellent substitute in the following combination, viz: Take of Canada Balsam two fluidounces, Oil of Turpentine four fluidrachms, Spirits of Nitric Ether eight fluidounces, Pulverized Camphor two drachms ; mix these together. The dose is a fluidrachm three times a day. In cases where the inflammatory symptoms have been subdued, pulverized Kino, two drachms, may also be added.

Applied to the skin, Canada balsam produces redness and slight irritation ; and is frequently employed as a stimulant to indolent, and erysipelatous ulcers; it likewise enters into the composition of several salves and irritating plasters. The dose of Canada balsam varies from five to twenty grains, which may be repeated two or three times a day. It may be administered in emulsion, or in pill form. Pereira states that when mixed with about one twenty-eighth part of its own weight of calcined magnesia, Canada balsam solidifies in about twelve hours.

ABIES CANADENSIS.

Hemlock Spruce.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE CONCRETE JUICE, CANADA PITCH, GUM HEMLOCK.

Description.—This tree seldom rises above about seventy-five feet, with the *trunk* large in proportion, straight, and covered with a rough bark; the *branches* are brittle and nearly horizontal, with pubescent twigs. The *leaves* are about half an inch in length, linear, obscurely fine-toothed, glaucous beneath, in two opposite rows. The *cones* or *strobiles* are very small, ovoid, terminal, drooping, with a few rounded, entire scales.—*G.*—*W.*

History.—The foliage of this tree is delicate, bright-green, above, and silvery-white underneath; its timber is very coarse-grained.—*G.* The bark is extensively employed by tanners on account of the large amount of tannic acid contained in it. The tree is found in the same latitudes and elevations as the *A. Balsamea.* It flowers in May. The juice or oleoresin oozes from the tree, without any incisions being made, and concretes upon its external surface; the bark is removed from the tree, cut into large fragments, and boiled in water. As the resin ascends to float upon the water, it is removed by skimming and thrown into cold water. It is then placed in a coarse linen bag, and boiled a second time, to remove its impurities.—*Jour. Phil. Col. Pharm.*, vol. II., p. 20.

Purified Canada-pitch or gum Hemlock, is at first whitish, but gradually becomes darker-colored, changing to a yellow, brown, or blackish color. It is pulverable, almost insipid, of a faint characteristic odor, unlike that of turpentine, and has the sp. gr. 1.033. A gentle heat renders it soft and tenacious, and when elevated to nearly 200° F., liquifies it. It consists of resin, with a small quantity of volatile oil.

Properties and Uses.—Gum Hemlock is a mild stimulant, and when in contact with the skin for a few hours causes a slight degree of redness. It is frequently substituted for Burgundy Pitch, as it possesses similar virtues. The tincture of the Hemlock pitch is diuretic and stimulant. The essential oil of this tree, the Oil of Hemlock, has occasionally been used by pregnant females to cause miscarriage, but serious effects are apt to follow therefrom. As a liniment, this oil has been used in croup, rheumatism, and other affections requiring a stimulating local application. The essence of hemlock is diuretic and stimulant; Dr. W. K. Everson states it to be a superior remedy in gastric irritation to allay vomiting in cholera-morbus, etc.; the dose is five or ten drops in water, every ten or twenty minutes, until relief is afforded. I have found the following preparation very beneficial as an internal agent, in rheumatism, colic, flatulency, acid-stomach, pains or soreness of the chest or stomach, languor, depression of spirits, hysterics, pyrosis, and many other chronic and painful affections. Take of Balsam Tolu, Guaiac Resin, Gum Hemlock, Myrrh, of each, coarsely powdered, two ounces, Oil of Hemlock three ounces, Oil of Wintergreen two ounces, Alcohol one gallon. Mix and allow them to macerate for two weeks, frequently agitating. The dose is a fluidrachm in half a wineglass of sweetened water; or in severe cases, it may be increased to half an ounce. I have employed this preparation for several years, and can confidently recommend it to the profession as an effectual agent in the above disorders. A strong decoction of the bark of this tree is beneficial in leucorrhea, prolapsus-uteri, diarrhea, etc., administered internally, and used in enema; it is likewise of service, as a local application, in gangrene.

ABIES EXCELSA.

Norway Pine. Norway Spruce Fir.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE CONCRETE JUICE. BURGUNDY PITCH.

Description.—This tree inhabits Germany, Russia, Norway, and other northern parts of Europe, as well as of Asia. It is a large tree, often having a diameter exceeding four feet, and attaining an altitude of one hundred and forty feet. The *leaves* are somewhat tetragonal, short, scattered, mucronate, dark green, and glossy above. The *male catkins* are solitary, growing out of the axils, and purplish; *scales* staminiferous at the apex. The *female catkins* are simple, purple, and growing from the summit; *ovaries* two; *cones* cylindrical, pendent, with oval, imbricated, slightly indented scales. The Polyporus officinalis, or *Larch Agaric*, is a fungus, nourished on this tree. The *hymenium* is concrete, with the substance of the pileus consisting of subrotund pores with their simple dissepiments. *Pileus* corky-fleshy, ungulate, zoned, smooth. *Pores* yellowish. It is acrid, irritating mucous surfaces with which it comes in contact, causing sneezing, cough, nausea, vomiting, or purging, according to the parts acted upon. From three to eight grains taken before bedtime, is said to check the sweating of phthisis.

ABIES PICEA.—*Silver Fir.*—*Silver Pine.*—This tree grows in the mountains of Siberia, Germany, and Switzerland.—*L.* Its *branches* are horizontal; *leaves* copious, linear, either acute or emarginate, entire, spreading more or less perfectly in two rows, and sometimes curved to one side; their upper surface of a dark shining, rather glaucous, green; the under glaucous white. *Male flowers* numerous, axillary, solitary, about as long as the leaves, yellow; their axis the length of the toothed involucre; *anthers* remarkable for their rounded two-lobed crest, crowned with a pair of divaricated horns. *Female catkins* lateral, erect, cylindrical, green; *bracts* much narrower than the capillary scales, distinguished by a long, projecting, awl-shaped point, very conspicuous in the full-grown cones, which are also erect, three or four inches long, cylindrical, of a reddish green, till they turn brown in drying.—*L.*

History.—These trees yield the oleo-resinous substance of commerce, called Burgundy Pitch. The spontaneous exudation from them is in the form of concrete tears, and is the *Abietis Resina*, or the *Thus* or *Frankincense* of commerce; which when boiled in water, and strained forms true Burgundy Pitch. When pure, Burgundy Pitch is in opaque and amorphous masses, pulverable, somewhat of a buff or straw color, a strong, peculiar, balsamic odor, which diminishes by age, and a sweet, faintly turpentine flavor, without bitterness. It melts very readily, and is softened at 95° F., becoming very tenacious. It contains a very minute quantity of volatile oil. More commonly it is mixed with foreign matters, from which it may be freed by straining the resin after having melted it. According to Pereira, the Burgundy Pitch of the shops is generally a spurious article, being made of resin rendered opaque by the incorporation of water, and colored with palm oil. Spurious pitches may be known by their different odor, their bright-yellow color, their numerous vesicles, and by the aqueous vapor they yield when heated.—*C.*

Frankincense is in the form of concrete tears, which are brittle, of an external yellowish color, lighter within internally, a bitterish, acrid taste, nearly inodorous, but yielding an agreeable exhalation when ignited. It is acted upon by a heat of 95° F., the same as Burgundy Pitch, on which account it is sometimes employed in the preparation of plasters.

Properties and Uses.—Burgundy Pitch is generally used externally for the purpose of producing a redness of the surface with a slight serous exhalation. Occasionally it produces an eruption of pimples, and sometimes minute blisters; and has been known to cause, in some rare instances, hardness, considerable suffering, and irritation terminating in one or more ulcers. It has been principally employed as a counter-irritant in chronic diseases, especially of the lungs, stomach, intestines, etc., as well as in local rheumatic affections. It enters into several salves and plasters.

Strasburgh Turpentine is also procured from the *Abies Picea*, the properties and uses of which are similar to those of Oil of Turpentine.

Off. Prep.—Emplastrum Picis Compositum; Emplast. Resinæ Composit.; Linimentum Olei Composit.; Liniment. Cajuputi Composit.; Liniment. Camphor. Composit.

ABIES LARIX. (*Larix Europœa.*)

Larch.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

RESINOUS EXUDATION. VENICE TURPENTINE. (See *Oleum Terebinthinæ.*)

Description.—The Larch is a tree of straight and lofty growth, with wide-spreading branches, whose extremities droop in the most graceful manner. The *buds* are alternate, perennial, cup-shaped, scaly, producing annually a pencil-like tuft of very numerous, spreading, linear, bluntish, entire, smooth, tender, bright-green, deciduous *leaves*, about an inch long. *Male flowers*, drooping, about half an inch long, yellow; *female catkins*, erect, larger than the male flowers, and variegated with green and pink; *cones*, erect, ovate, about an inch long, purple when young, reddish-brown when ripe, their *scales* spreading, orbicular, slightly reflexed, and cracked at the margin.—*L.*

History.—The Larch inhabits the mountainous regions of Europe. *Venice Turpentine* is obtained from the trunk. The bark contains a large amount of tannic acid. According to Lindley, "a saccharine matter called *Manna of Briancon* exudes from the branches, and when the Larch forests in Russia take fire, a gum issues from the trees during their combustion, which is termed *Gummi Orenbergense;* and which is wholly soluble in water like gum Arabic."—*Flor. Med. p.* 555.

Pure Venice Turpentine possesses a left-handed circular polarization; it is a colorless, transparent liquid, somewhat resembling Canada balsam, having a sweet citron odor, and a moderately bitter, hot taste; sometimes it is met with of a darker color, more opaque, more bitter, and less agreeable odor. Alcohol dissolves it entirely, but slowly; it is also soluble in caustic potassa or soda. A sixteenth of magnesia speedily renders it solid. A spurious brownish article is met with, composed of common resin and oil of turpentine, which should not be confounded with the genuine.

Properties and Uses.—(See Oil of Turpentine.)

Off. Prep.—Unguentum Stramonii Compositum.

ABIES NIGRA.

Black Spruce. Double Spruce.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

DECOCTION OF BRANCHES. ESSENCE OF SPRUCE.

Description.—This tree grows in the northern parts of this continent, and in elevated situations in the Middle States. It attains the height of from forty to seventy feet, having very dark green *leaves*, short, erect, rigid, and the *cones* one or two inches long, reddish-brown, ovate, and their *scales* rounded, entire, wavy and toothed at the apex.—*G.*

Properties and Uses.—An aqueous decoction of the young branches, strained and concentrated, forms the well known Essence of Spruce, which enters into the formation of Spruce Beer, an agreeable and salutary summer beverage, possessing diuretic and antiscorbutic properties, and valuable on board ships. Spruce Beer may be made as follows: Take of Ginger, Sassafras bark, and Guaiacum shavings, each, two ounces; Hops, four ounces; Essence of Spruce ten ounces; Water four gallons; mix them and boil for ten or fifteen minutes, then strain, add ten gallons of warm Water, three quarts of Molasses, and twelve fluidounces of Yeast, and allow it to ferment. While fermentation is going on, put in strong bottles, and cork them well.

ACACIA ARABICA. (*Acacia Vera.*)

Acacia.

Nat. Ord.—Fabaceæ, or Leguminoseæ. *Tribe.*—Mimoseæ. *Sex. Syst.*—Polygamia Monœcia.

THE CONCRETE JUICE. GUM ARABIC.

Description.—Acacia Arabica, also known by the name of *Egyptian Thorn*, or *Egyptian Gum Arabic* is a small tree or shrub, but which sometimes attains the height of forty feet, with a trunk from three to four feet in circumference. The *leaves* are bipinnate, having about five pairs of pinnæ, with a gland on the common leaf-stalk, between the first and last pairs. The *leaflets* are linear, minute, glabrous, in fifteen or twenty pairs. *Thorns* stipulary, sometimes long, sometimes short or almost wanting. *Flowers* small, yellow, in globose heads; *corolla* five-cleft; *stamens* numerous, distinct. *Peduncles* aggregated, axillary or forming a terminal raceme by the abortion of the leaves. *Legumes* stalked, compressed.

thickish, contracted on both sutures between the seeds. This tree is common all over India and Arabia.—*L.*

ACACIA VERA is a moderate-sized tree, having its stem crooked, bark grayish, with many branches, scattered and covered with a purplish, or yellowish-green bark. The *leaves* are bipinnate, smooth; *pinnæ* in two pairs, with a gland between them; *leaflets* eight or ten pairs, oblong-linear. *Spines* sharp, and in pairs. *Flowers* in globose heads; *heads* about two together, stalked, axillary. *Legume* about five inches long, compressed, smooth, moniliform, light-brown. *Seed* flattish. This tree inhabits Africa, from Senegal to Egypt.—*L.*

History.—Of the trees from which Gum Arabic is obtained, and which inhabit the southern parts of Asia, and the upper portions of Africa, the A. Arabica is the most common. Several species are said to yield the gum, and, probably contribute to supply that found in commerce, but those above-named furnish the principal part of it. The gum flows naturally from the bark of the trees, in the form of a thick and rather frothy liquid, and speedily concretes in the sun into tears; sometimes the discharge is promoted by wounding the trunk and branches. The secretion is most abundant in dry, hot seasons, and among old stunted trees, especially after a rainy season has softened their bark, and rendered it apt to split during the succeeding hot weather. The more sickly the tree appears, the more gum it yields; and the hotter the weather the more prolific it is. *Jackson, account of Morocco, 3d Ed., p.* 137.

The best quality of Gum Arabic is colorless or very pale yellowish-white, of a shining, conchoidal, vitreous fracture, opaque in mass, but transparent in small fragments, hard but pulverable, inodorous, and of a sweet and viscous taste. It is generally in tears, round, or angular, and seldom larger than a hazel-nut. The yellowish-red or brownish tears belong to the second quality, and may be rendered colorless by the action of sunlight, or when treated with chlorine water. The specific gravity is from 1.33 to 1.52. It almost invariably forms a white powder.

Cold or hot water dissolves its own weight of Gum Arabic, forming a thick mucilaginous solution, and from which the gum may be obtained by evaporation, or by precipitation with excess of alcohol; the concentrated solution may be kept much longer than the dilute, which latter, especially in warm weather, undergoes the acetous fermentation. The gum is also soluble in solutions of the pure alkalies, lime water, and dilute acids. Alcohol does not dissolve it, neither does ether or the oils. When boiled with sulphuric acid an unfermentable variety of sugar is formed; but with nitric acid it passes into mucic, malic, and finally into oxalic acid.—*Ed.* Treated with a solution of the neutral sesquichloride of iron, the mucilage of Gum Arabic becomes a light reddish jelly; with a solution of borax it forms a firm, colorless jelly, which is liquified by powdered sugar; and, with a solution of sugar, it furnishes by dessication a clear, hard, amorphous mass. Its decomposition is readily effected by the strong acids.

Analysis has found it to contain muriate and bimalate of lime, muriate and acetate of potassa, and some other earthy matters. Berzelius, Prout, Mulder, and Guerin have made ultimate analyses of the gum, and found it to consist of Oxygen, Carbon, and Hydrogen.

Dr. G. G. Shumard has recently introduced to the profession a species of gum discovered in Texas and New Mexico, and which answers the purpose of the best Gum Acacia, forming a beautiful mucilage with water, and possessing much greater tenacity. It exudes spontaneously from the Mezquite tree, in a semifluid state, and hardens in a few hours, forming lumps of various sizes and colors, which whiten by exposure to sun-light, and finally become translucent and often filled with minute fissures. It is called *Gum Mesquite*, *Mezqnite*, *Muckeet*, *Musqnit*, etc. The tree from which it is obtained is either the Strambo carpa pubescens or Screw-pod Mimosa of Gray, or more probably the Algarobia glandulosa (or Prosopis dulcis, of Kunth.) According to Prof. Procter, this gum consists of tears of various sizes and degrees of purity, from colorless to dark amber color. The pieces are much fissured, and when broken, soon exhibit a tendency to crack into fragments. They are easily pulverized, forming a dull white powder. Their specific gravity is 1.311. It is soluble in water without swelling, and the solution has a slight acid reaction ; alcohol precipitates it in white flocks like arabin ; neither neutral or basic acetate of lead precipitate it, unless ammonia is subsequently added, when a bulky gelatinous substance is thrown down. No coagulation occurs with powdered borax, and no precipitate with tersulphate of iron. Boiled with an alkaline solution of oxide of copper, no reduction occurs indicative of glucose. Iodine occasions no change ; oxalate of ammonia instantly causes a white cloud in the clear solution. Concentrated sulphuric acid dissolves it, and when heated chars it ; heated in nitric acid till effervescence ceases, it affords mucic and oxalic acids ; exposed to a red heat it swells up, burns, and leaves a bulky-grayish white ash, amounting to 2.1 per cent. of the gum heated. It may be obtained easily and in great abundance. Dr. Campbell Morfit found it to consist of water 11.640, foreign matters 0.236, bassorin 0.206, arabin 84.967, ash 3.000 ; its ultimate elements being Carbon 43+, Hydrogen 6+, Oxygen 47+, Ash 3. Prof. Procter doubts the identity of the arabin in the above analysis, with that found in Gum Arabic.

Properties and Uses.—Gum Arabic is nutritive and demulcent, and exerts a soothing influence upon irritated or inflamed mucous tissues, by shielding them from the influence of deleterious agents, atmospheric air, etc. On this account it has been used in diarrhea and dysentery, to remove tenesmus and painful stools, in catarrh, cough, hoarseness, gonorrhea, ardor-urinæ, etc.—*Coxe*. It may be given almost *ad libitum* in powder, lozenge, or solution, alone, or combined with syrups, decoctions, etc. In acute diseases where it becomes necessary to use the lightest and most readily digested food, there is no article, probably, equal to Gum Arabic. It may be used for this purpose by dissolving the gum in powder, half an ounce, in five ounces of water, and sweetening with loaf-sugar, of which tablespoonful may be given every two or three hours; in low stages of fever, in typhoid fever, and wherever a mild stimulant is required, one ounce of a saturated solution of camphor in sulphuric ether may be added to the above, and administered in the same way; it is diuretic, promotes the action of the absorbents, and does not materially increase arterial action. Equal parts of pulverized alum and Gum Arabic form a good preparation to check hemorrhages from small cuts, wounds, etc.

Externally, the application of its solution to burns and scalds has proved serviceable, repeating it until a complete coating is secured. It is likewise much used for compounding pills, lozenges, mixtures and emulsions; also for administering insoluble substances in water, as oils, resins, balsams, camphor, musk, etc.

MUCILAGE OF GUM ARABIC.—To four ounces of finely pulverized Gum Arabic, add, very gradually, a pint of Boiling Water, and rub the whole until perfectly blended. Dose, *ad libitum.* When Gum Arabic is adulterated with cherry gum, it is not easy to form a good mucilage; the *cerasin* of the cherry gum will cause it to be ropy.

ACACIA CATECHU.

Catechu. (*Cutch. Gambeer. Terra Japonica.*)

Nat. Ord.—Fabaceæ, or Leguminoseæ. *Tribe.*—Mimoseæ. *Sex. Syst.*—Polygamia Monœcia.

EXTRACT OF THE WOOD.

Description.—Acacia Catechu is a small-sized tree, from fifteen to twenty feet high. The *bark* is thick, scabrous, rust-colored, slightly bitter, and exceedingly astringent. The *branches* are spreading, armed with strong, black, stipulary spines, downy toward their extremities. *Leaves* bipinnate; *pinnæ* ten to thirty pairs; *leaflets* thirty to fifty pairs, linear, bluntish, unequal and auricled on the lower side of the base, ciliated; *petiole* angular, channeled above, downy, with one orbicular urceolate green gland below the lowest pair, and smaller ones between the two, three or four terminal pairs of pinnæ. *Spikes* axillary, one or two together, slender, cylindrical, on downy stalks. *Flowers* numerous, white or pale-yellow, sessile. *Calyx* downy, tubular, five-toothed; *teeth* erect. *Corolla* rather longer than the calyx, five-petaled, glabrous. *Stamens* twice the length of the corolla, very numerous, distinct; *anthers* roundish. *Ovary* green, glabrous, shortly stipitate; *style* capillary, as long as the stamens; *stigma* simple. *Legumes* flat, linear, thin, straight, glabrous, with about six orbicular, compressed seeds.—*L.*

History.—The Catechu tree is common to the East Indian continent, thriving in Bengal, on the Coromandel and Malabar coasts, etc., and according to Pereira, in Jamaica. According to Dr. Royle it is prepared by concentrating a strong aqueous decoction of the reddish inner wood, and pouring it into square clay molds to dry. Catechu is likewise obtained from the *Areca Catechu* and *Uncaria Gambir*. There are several kinds of it met with in commerce, but the best are those which are the most astringent.

Catechu is met with in square, round, and irregular pieces, pale red, pale brown, dark brown, or blackish in color, friable, odorless, astringent, and sometimes having a sweetish after-taste. Its specific gravity is 1.28 to 1.39. The best Catechu varies in color from deep chocolate brown to arnatto-red, is compact, brittle, presenting an uneven, splintery, glistening fracture, and very astringent. It is soluble in hot water, which takes up its tannic and catechuic acids, but a reddish matter is deposited as the solution cools. It is imperfectly soluble in cold water. The tannic acid of Catechu is easily soluble in water and alcohol, but very slightly so in ether. Alcohol or ether dissolves its catechuic acid. Its solutions are not precipitated by alkalies. Its chemical actions are similar to those named under Tannic Acid.

According to Sir H. Davy, Catechu contains from 4 to 5 parts of tannic acid, 3 to 3½ of peculiar extractive, ½ to ¾ of mucilage, and nearly the same amount of insoluble matters. Buchner found the extractive to be principally composed of catechuic acid, or catechine. The tannate of iron made by adding a solution of the salts of iron to a decoction of Catechu is colored black.

It is *incompatible* with solutions of the pure earths, with sulphuric or muriatic acid, salts of alumina, lead, copper, and of the sesquioxide of iron, also with gelatin, opium, cinchona, and those salts of the vegetable alkaloids which form insoluble salts with tannin.

Properties and Uses.—Catechu possesses strong astringent properties. It is used for arresting mucous discharges when excessive, for removing relaxation or congestion of mucous membranes, and for checking hemorrhages. In chronic diarrhea, chronic catarrh, colliquative diarrhea, and chronic dysentery, it has proved beneficial, especially when combined with opium. As a local application it is a valuable agent for removing cynanche tonsillaris, aphthous ulcerations of the mouth, elongation of the uvula, and relaxation and congestion of the mucous membrane of the fauces, especially of the kind to which public singers are subject; it is also useful in congestion, tenderness and sponginess of the gums, particularly when the result of mercurial ptyalism. The tincture of catechu is often useful in fissure of the nipples, when applied twice a day with a fine hair pencil. An ointment composed of four ounces of Catechu, nine drachms of alum, four ounces of white resin, and ten fluidounces of olive oil, with a sufficient quantity of water, is in great repute in India as an application to ulcers; *Thomson, Lond. Dis.* Chronic and phagedenic ulcers are frequently benefited by the application of Catechu to them. Chronic gonorrhea, old gleets, and fluor-albus have been cured by the local application of an aqueous solution of Catechu, as well as hemorrhage from the nose and other parts. Powdered Catechu may be given in a dose of from five to twenty grains, or more, repeated as often as required; it may be administered in pill form, or in treacle, or in gum-mucilage. The dose of the tincture is from twenty minims to half a fluidounce. Dr. E. Hopkins, Sylvania, Wis., states that Catechu is not incompatible with opium and quinia, as no precipitate ensues when their respective solutions are united. He recommends in diarrhea, a compound of Catechu ten grains, Opium one grain, Sulphate of Quinia two grains; mix, and make into one or two powders, according to the urgency of the case.

ACETUM.

Vinegar.

VINEGAR, PREPARED BY FERMENTATION OF CIDER, MALT, OR WINE.

ACETUM BRITTANICUM.—Common British-made Vinegar, from infusion of malt. Specific gravity 1006 to 1019.

ACETUM GALLICUM.—French Vinegar from wine. Sp. gr. 1014 to 1022.

ACETUM DESTILLATUM.—Distilled Vinegar. Sp. gr. 1005.

See PYROLIGNEOUS ACID.

History.—Vinegar is the result of a fermentation, known as the *acetous*, by which certain liquids or infusions undergo a change causing them to have a manifest sourness to the taste. Those fluids which are capable of acetous fermentation possess more or less saccharine matter, as fruits, grain, etc., whose expressed juices or infusions have undergone a previous fermentation, called the *vinous*. In order to effect an acetous fermentation nothing more is required than mere contact of the liquid with the air, at a temperature ranging from 70° to 95° F., and which is accompanied with the formation of a remarkable vegetable, of a fungus and microscopic character, consisting of the mycelium of *penicillium glaucum*, vegetating actively, and increasing by crops of *conidia* or gemmæ; by some this Vinegar plant has been named *torula aceti.* During this process the alcohol of the previous vinous fermentation disappears, and its place is occupied by Vinegar. The theory of fermentation is but imperfectly understood, but the supposition is that by absorbing oxygen from the atmosphere, the ethyle of the alcohol of liquids which have undergone vinous fermentation loses two equivalents of hydrogen, thus converting the alcohol into aldehyd, leaving the radical acetyle, $C_4 H_3$, in the place of the ethyle. The aldehyd, or rather the radical acetyle next takes up two additional equivalents of oxygen, forming hydrated acetic acid, consisting of four equivalents each of oxygen, hydrogen, and carbon. *Aldehyd* or dehydrogenated alcohol, is a clear, colorless liquid, of a peculiar and powerful ethereal odor, of specific gravity 0.79 at 65°, and boiling at 70°; it is neutral, inflammable, and mixes in all proportions with water, alcohol, and ether. It rapidly imbibes oxygen, and is a constant ingredient of nitrous ether. Its formula is $C_4 H_3 O + HO$. When heated with caustic potassa, aldehyd is rapidly converted into *resin of aldehyd*, which swims on the surface of the liquid in the retort in the shape of a brownish, plastic substance, which, when exposed to the boiling point, evolves a disagreeable odor.

Vinegar is prepared from many substances; in France red wines are principally employed; in Britain it is made from different kinds of malt liquor, cider, saccharine fluids, etc.; and in the United States from cider and whisky chiefly. The Germans have a quick method of making Vinegar, by mixing certain proportions of alcohol, water, and honey, extract of malt or ferment, and which by a certain process, named in Pereira's Materia Medica, page 937, is converted into Vinegar in from twenty-four to thirty-six hours. Vinegar is likewise made by several other processes, some of which require a comparatively short time for its formation. The surface of Vinegar is frequently covered by moldiness, *mucor mucedo;* a small fly, *musca cellaris*, is apt to infest it; microscopic animals, called vinegar eels, *anguillula aceti* are common to Vinegar containing mucilage and no sulphuric acid; and on long standing, or when kept in open vessels, a gelatinous, vegetable substance called the "mother of Vinegar," *mycoderma cerevisia*, is formed at the expense of the acid, rendering the Vinegar turbid and weaker. These matters may be removed by boiling the vinegar, and then filtering it.

Good Vinegar has a peculiar and grateful odor, and an agreeably sour taste. Its color depends somewhat on its mode of manufacture; when prepared from malt liquors it is yellowish-red; when from wine it is pale or deep red, depending upon the white or red wine from which it is made; and when from cider it is pale-yellow. The high-colored Vinegars may be rendered colorless by filtration through wood ~~animal~~ charcoal.

The most injurious adulterations in Vinegar are the following: *Sulphuric acid*, which forms a white precipitate when a solution of chloride of barium is added to it, and which is insoluble in nitric acid; when Vinegar is free from sulphuric acid, acetate of lead has no action upon it. *Copper* may be detected by the addition of ammonia in excess, which renders the Vinegar blue; when Vinegar is free from copper, it yields no precipitate on the addition of hydrosulphuric acid. Vinegar containing *lead* gives a yellow precipitate of iodide of lead, when iodide of potassium is added to it; when it is free from lead, hydrosulphuric acid causes no precipitate.

Properties and Uses.—Vinegar forms an agreeable cooling drink in fevers, especially when the tongue is coated dark or brown; it diminishes inordinate vascular action, allays thirst, neutralizes excess of alkali, and increases the urinary discharge. In typhus, scurvy, and putrid diseases, it acts as an antiseptic. In urinary affections, attended with a white sediment, consisting mainly of phosphate of lime, and ammoniaco-magnesian phosphate, it has been recommended. In dysentery and scarlatina, Vinegar saturated with common house salt, has been very beneficial. A large tablespoonful of the mixture must be added to four of hot water, of which a tablespoonful is to be taken, as hot as may be, every two or three minutes, till the whole is consumed. A similar preparation was found very effectual in the treatment of Asiatic cholera, in Cincinnati, during 1849–50, and will be found a beneficial external application in external inflammations, contusions, severe injuries to joints, swellings, etc. According to Christison, its vapor inspired with that from hot water from a proper inhaler is of decided service in most varieties of laryngeal inflammation, hoarseness, relaxed sore-throat, and ulceration of the fauces; inhalation will also be found of great utility in dryness and irritation of the pulmonary tubes during measles and other exanthematous diseases. It is a favorite domestic remedy for fumigating the apartments of those ill of contagious diseases; though it does not destroy the infection, it renders the atmosphere less disagreeable.

Vinegar has been used as a gargle, or its vapor inhaled, in putrid sore-throat, ulceration of the fauces, hoarseness, etc.; it has also been applied locally in some cases of ophthalmia, in epistaxis, several cutaneous diseases, and, diluted with water, has been used as an injection into the rectum in hemorrhoidal affections, and into the uterus in cases of uterine hemorrhage. It forms a valuable adjuvant to cooling lotions. The dose internally is from one to four fluidrachms; as an injection, one or two fluidounces diluted with twice or thrice its bulk of water.

Distilled Vinegar is used for the same purposes as above, and is the solvent to be employed in making the various medicated Vinegars of opium, squill, colchicum, etc. Care must be taken, when using Vinegar medicinally, not to obtain the spurious and adulterated articles, containing sulphuric acid, muriatic acid, nitric acid, copper, lead, etc. One part of acetic acid to five of distilled water, forms a very good Vinegar for culinary and medicinal purposes.

Off. Prep.—Acetum Emeticum; Acetum Lobeliæ; Acetum Sanguinariæ; Acetum Scillæ; Tinctura Opii Acetata; Tinctura Sanguinariæ Acetata; Lotio Refrigerans; Lotio Lobeliæ Compositum.

ACHILLEA MILLEFOLIUM.

Yarrow.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—Yarrow, also called *Milfoil*, is from ten to twenty inches high, with simple *stems*, branching at top. The *leaves* are bipinnatifid, crowded, alternate, with linear, dentate, mucronate segments. The *flowers* are white or rose-colored, and are arranged in a dense, flat-topped, compound corymb; *involucre* oblong and imbricated. *Rays* four or five, short; *receptacle* chaffy, small, flattish. *Achenium* oblong, flattened, margined.—*G. W.*

History.—Yarrow inhabits Europe and North America; it survives and produces flower stems from year to year, and is found in pastures, meadows, along roadsides, etc., flowering from May to October. The plant possesses a faint, pleasant, peculiar fragrance, and a rather sharp, rough, restringent taste, which properties are due to tannic and achilleic acids, essential oil, and bitter extractive; alcohol, or water is its proper menstruum.

According to M. Zanon, the active principle of this plant *Achilleine*, has been used as a substitute for sulphate of quinia in intermittent fevers, in the south of Europe. It is prepared by boiling five pounds of the dried plant with sixteen pounds of rain-water for about two hours. The residue is again boiled twice with smaller quantities of water, the decoctions are then filtered and mixed. These are then clarified with white of egg, and evaporated at a gentle heat until a whitish pellicle is formed on the surface. After twenty-four hours the cold liquid deposits a mass consisting for the most part of vegetable fiber, green coloring substance, with some coagulated albumen, extractive matter insoluble in alcohol, lime-salts, and traces of silica. The bitter and acid liquid is filtered, and then treated with an excess of hydrate of lime, which produces a white precipitate; upon this the liquid is treated with acetate of lead as long as any precipitate is formed. This precipitate is collected on a filter, and the solution saturated with sulphureted hydrogen, after which it still possesses a yellowish color and a very bitter taste. On evaporation it yields nearly half a pound of dry extract, which, as well as the previously filtered sulphuret of lead, are exhausted with alcohol. The two mixed and evaporated, yield about seven ounces of Achilleine.

The Achilleine obtained in this manner, contains some acetate of lime, resin, etc., but which may be avoided by treating the neutralized decoction (above, by hydrate of lime) with animal charcoal, then evaporating to dryness, and finally extracting with boiling absolute alcohol.

The color of Achilleine is instantly destroyed by chlorine; it is not precipitated by tincture of galls nor acetate of lead, but it is thrown down by basic acetate of lead; it is soluble in ammonia, and the solution, when exposed to the air until the ammoniacal odor has disappeared, deposits brown flakes, which are less soluble than Achilleine; the slight trace of resin in Achilleine may be removed by solution in water.

Achilleic acid is obtained by treating the decoction of Yarrow with acetate of lead as long as any precipitate is formed, this is suspended in water, and decomposed with sulphureted hydrogen. The liquid obtained will be very acid, and contain some lime and green coloring substance; to precipitate the lime, supersaturate it with carbonate of potassa, and then treat it with animal charcoal. The potassa-salt may be precipitated with acetate of lead, and the precipitate decomposed with sulphureted hydrogen. Achilleic acid is not volatile at 212° F.; its solution can therefore be concentrated by evaporation in the water-bath. The greatest concentration to which it can be brought is 1.014825. In this state it is perfectly colorless, but on further evaporation it becomes straw-colored. Exposed to the air in a glass or porcelain dish, it crystallizes in perfectly colorless quadrilateral prisms. The crystallized acid requires at 56° F. two parts of cold water for solution; the solution is very acid, makes the teeth rough, has no odor, and strongly reddens litmus paper. Added by drops to a clear solution of acetate of lead, it does not render it in the least turbid; but in a solution of basic acetate of lead it immediately produces a white precipitate, which is very slightly soluble.

Achilleic acid forms salts with carbonates of potassa and soda, ammonia, lime, magnesia, and quinia, which may become useful therapeutical agents. The achilleate of quinia is very soluble, and may be found superior to the sulphate of quinia; it may be made by dissolving quinia in very slightly diluted acid, allowing the substances to act on each other for several days, stirring them frequently, until the liquid no longer reddens litmus paper. Then filter, and add some alcohol; heat it nearly to boiling, and allow it to cool, when nearly the whole liquid is converted into very beautiful radiate-grouped prismatic crystals, which are very bitter, and readily soluble in water or alcohol.

Properties and Uses.—Yarrow possesses slightly astringent properties, and is said to be likewise alterative and diuretic, in decoction. It has been efficacious in hemoptysis, hematuria, incontinence of urine, diabetes, hemorrhoids, and dysentery; also in amenorrhea, flatulency and spasmodic diseases, and in the form of injection in leucorrhea. The infusion may be given in doses of from two to four fluidounces, three or four times daily; the essential oil from five to twenty drops. In menorrhagia, half a fluidounce of the saturated tincture, repeated three or four times daily, has been found advantageous; a few drops of oil of anise will cover its unpleasant taste. The late Prof. T. V. Morrow made much use of an infusion of this herb in dysentery.

Achillea Ptarmica or Sneezewort, grows in hedges and thickets, and in moist places in various parts of the country. It is about two feet in height, with the *leaves* sessile, linear or slightly lanceolate, acuminate, equally and sharply serrate, with appressed teeth, and smooth. The *flowers* are white, and arranged at the top of the plant in a diffuse corymb. The leaves are remarkably distinct from the Yarrow. The whole plant is pungent, exciting an increased flow of saliva. The powder of the dried leaves when snuffed into the nostrils, produces sneezing, which is supposed to be owing to their small, sharp, and marginal teeth.

ACIDUM ACETICUM.

Acetic Acid.

Preparation.—Take of Acetate of Soda, *two pounds;* Sulphuric Acid, *nine ounces;* Distilled Water, *nine fluidounces* (Imp. meas.).—*Lond.* In a tubulated glass, or leaden retort, large enough to hold twice the quantity of substances employed, the acetate of soda is first to be put, and then the sulphuric acid mixed with the water is to be added. Agitate the retort until a uniform mixture is obtained, then place it in a sand-bath, the bed of sand being about half an inch thick, and connect it with a capacious glass-receiver, into nearly the center of which the retort neck should reach. A leaden retort is preferable to glass, as there is no fear of its cracking as the temperature rises, nor will it contaminate the liquid, as when cast-iron vessels are used. That part of the retort neck in contact with the receiver should be surrounded with a strip of white paper, which fixes them more firmly, and renders them less liable to crack than when the two glass surfaces are in contact. Sand should now be added and raised around the retort to a level with the contents, and the retort be gently heated, gradually increasing the temperature. As soon as the receiver becomes warm, a continuous stream of cold water must be allowed to flow on it till the distillation is ended. The fire must be continued until the residue appears dry, and no more drops are visible at the beak of the retort; care being taken not to have too great a heat toward the end. When the apparatus has thoroughly cooled, the contents of the receiver must be poured into a glass-stoppered bottle. The specific gravity of the acid thus obtained is 1.048, and 100 grains of it are saturated by 87 grains of crystals of carbonate of soda.—*Witt. Lond.*

"Acetic Acid may also be prepared by pouring on five parts of the impure dried acetate of soda, a mixture of six parts of concentrated sulphuric acid, and five parts of water. Distil as in the preceding case.

"In order to decompose one equivalent of acetate of soda entirely over a sand-bath, it is necessary to use two equivalents of sulphuric acid, and thus to convert it into the bisulphate. 1028 parts of anhydrous acetate of soda require 1226 parts of concentrated sulphuric acid, or five parts of the first, and six of the acid. The five parts of water mixed with the acid, correspond to nine equivalents; and as the sulphuric acid gives up one equivalent of water (the other equivalent of water from the two equivalents of sulphuric acid combining with the bisulphate of soda) ten equivalents of water distil over with the Acetic Acid. The common acetate of soda generally contains a small quantity of extractive matter, and, toward the end of the process, the action of the sulphuric acid on it causes a blackening of the contents of the retort, with, at the same time, a disengagement of sulphurous acid, which renders the product impure. In this case, the distillate is shaken with a little peroxide of manganese, by which the sulphurous acid is converted into sulphuric and hyposulphuric acids, which combine with the oxide of manganese. The liquid is poured off the excess of peroxide of manganese, and re-distilled. The bisulphate of soda remaining in the retort readily dissolves in water, and the solution filtered from the insoluble black organic matter, may, after neutralization with lime, be used as Glauber's salts."—*Witt.*

In the first (London) formula given above, the proportions of the several articles are nearly equal to one equivalent or 137 parts of crystallized acetate of soda, one equivalent or 49 parts of the strongest sulphuric acid, and six equivalents or 54 parts of water. The resulting acid consists of 51 Acetic Acid, 114.58 water, while 2.42 of water remains in the retort.

Chemical Properties.—Acetic Acid is colorless, and of a pure, strong, acid smell and taste, free from empyreumatic odor. Its vapor reddens litmus, and fumes with ammonia. It is readily miscible with any quantity of water, and a definite proportion is soluble in alcohol. It decomposes carbonates of potassa, soda, lead, zinc, strontian, barytes, and magnesia, disengaging their carbonic acid. It dissolves several soft animal tissues, essential oils, resinous substances, camphor, etc., but they are precipitated by dilution.—*Coxe.* No residue should occur in evaporation. Sulphureted hydrogen, nitrate of barium, nitrate of silver, and ferrocyanuret of potassium should cause no change in it. For *tests*, see Distilled Vinegar.

Crystallized, glacial, or hydrated Acetic Acid, is the strongest Acetic Acid procurable. It forms a mass of colorless or pearly crystalline plates, of a very penetrating smell and sour taste; it melts between 55° and 61° F., and then forms a colorless, caustic, volatile fluid, having a specific gravity of 1.063. It boils at 248°, and is evaporizable at 160° F. Exposed to the air the crystals fume, from the abstraction and condensation of the vapors of water contained in the atmosphere, gradually lose their crystalline property, and become liquid. Glacial Acetic Acid blisters the skin, and soon produces a painful sore. From its volatility and tendency to absorb moisture from the atmosphere, vessels containing it should be well closed. It consists of Carbon 4, Hydrogen 3, Oxygen 3, and its formula is Ac.

Properties and Uses.—Concentrated Acetic Acid is corrosive and irritant; it dissolves the fibrin, albumen, and gelatin of the animal system. When used at all, it is as an external counter-irritant, producing redness or vesication as desired; to prevent its evaporation, it must be applied and covered with lint or cloth. It forms a very efficacious application in tinea capitis, and ringworm of the scalp; and from its solvent power over the soft tissues, it forms an excellent corrosive for corns and warts. Its vapor is very pungent and irritating, but when moderately inhaled forms a useful stimulant in some forms of headache, fainting, hoarseness, etc. Half an ounce of Camphor triturated with a little Alcohol to reduce it to powder, and then dissolved in six fluidounces of Alcohol, forms the Camphorated Acetic Acid of the Dublin Pharmacopœia, which is a pungent stimulant when snuffed up the nostrils; as it is extremely volatile and corrodes nearly all common metals except gold, it should be kept in glass vials, with ground-glass stoppers. *Henry's aromatic vinegar* is merely an acetic solution of camphor, oil of cloves, lavender, and rosemary. A preparation of this kind may be made extemporaneously by putting one drachm of Acetate of Potassa in a vial with a few drops of some essential oil, and twenty minims of Sulphuric Acid.—*Coxe.* M. Ricord speaks highly of this acid as a local application to venereal ulcers in the primary stage, to be applied as freely as any other caustic, and repeated as often as the condition of the chancres may require. Under its influence the ulcer speedily assumes a healthy aspect and promptly heals. He believes that it neutralizes the venereal poison, and thus obviates all danger of constitutional symptoms. We believe the same may be truly said of other acids, as the nitric, muriatic, tincture of chloride of iron, etc. Half a pint of Acetic Acid, added to five pints of distilled water, forms a valuable substitute for distilled vinegar, and is used in all preparations where precision is necessary.

Off. Prep.—Linimentum Terebinthinæ.

ACIDUM ACETICUM EMPYREUMATICUM. ACIDUM PYROLIGNEUM.

Pyroligneous Acid.

IMPURE ACETIC ACID, OBTAINED FROM WOOD BY DISTILLATION.

History.—Pyroligneous Acid is obtained by the destructive distillation of wood; it is a dilute acetic acid, containing creosote and other products arising from the distillation. By distilling it several times, then adding chalk, limestone, or carbonate of soda to neutralize the rectified crude acid, and decomposing the resulting acetate by sulphuric acid, a pure acetic acid may be procured. Pyroligneous Acid has a blackish color in quantity, but in small amounts is a clear, pale-yellowish, or chestnut-colored fluid, having a vinegary, empyreumatic odor. The tar remaining after the removal of the acid forms a valuable irritating plaster. Fish and meats, fresh or salted, immersed in the crude Pyroligneous Acid, acquire a smoky taste, and are as well cured as by the usual mode of smoking, beside being preserved from "skippers."

Properties and Uses.—Stimulant and antiseptic. Used as a local application for arresting or preventing sloughing, for cleansing old sores, abscesses, and burns, scalds, ringworm, tinea capitis, excoriated nipples, etc., and as a gargle in inflamed and ulcerated throat, and scarlatina maligna. Internally, in doses of from ten to thirty drops, it is useful in all cases where an antiseptic is indicated. The pyroligneous tar forms a valuable irritating plaster.

Off. Prep.—Linimentum Terebinthinæ.

ACIDUM BENZOICUM.

Benzoic Acid.

Preparation.—"A layer of coarsely powdered Benzoin, not more than half an inch thick, is spread over the surface of a flat earthen dish with a raised rim, on which a sheet of white bibulous paper is strained and pasted; over this is affixed a conical-shaped cap of glazed paper, with a diameter at base somewhat larger than the edge of the dish; and the apparatus thus prepared is placed on the iron plate of a stove, in which a gentle fire is kept up, which may afterward be somewhat increased, but not sufficiently to allow the resin to char, as the products of decomposition would in this case contaminate, the sublimed Benzoic Acid. From time to time the paper cap is taken off, and its contents, as well as the crystals on the filtering paper, brushed off into a proper vessel. When no more sublimate is formed the process is ended."—*Witt.* This forms a perfectly white product, being equal to about $\frac{1}{12}$th or $\frac{1}{16}$th of the resin taken. As a certain portion is always lost in this process, owing to decomposition, another mode is recommended by Wittstein, called the wet method, in which eight parts of benzoin yield one or one and a half parts of the acid, not quite so white as by the former process, but sufficiently pure for medicinal purposes. "In a glass or copper vessel, mix eight parts of powdered Benzoin with two of Hydrate of Lime, shake well together, and add about sixteen parts of distilled Water, so that the whole forms a thin paste. Place the flask or vessel in a sand-bath for twenty-four hours, frequently agitating it, and renewing the water as often as it evaporates. The pasty mass must now be transferred to a copper vessel, one hundred parts of water added, and being constantly stirred with a wooden spatula, the whole is boiled until about thirty parts of water have evaporated; while still hot, filter through white blotting-paper spread on linen; again boil the residue with fifty parts of water, filter, mix the two solutions together, and evaporate to thirty-two parts. To the solution of benzoate of lime thus formed, add Hydrochloric Acid sp. gr. 1.130, as long as it causes a turbidness, or about two parts, constantly stirring all the time. Then allow the whole to remain undisturbed in a cool spot for a day or two, when the whole will be found changed into a thick crystalline paste; the hydrochloric acid decomposing the benzoate of lime, separating the Benzoïc Acid in fine crystals, while the chloride of calcium remains in solution. The Benzoic Acid may be separated by a linen strainer, pressing the solution well through, drying, and then boiling with twenty times its weight of water, which separates it from any resin which may be present. When dissolved, the solution is strained through linen, and allowed to stand a day or two; the crystals are then separated, pressed in bibulous paper, and dried." Or they may be sublimed to render them pure, but in which process a loss will inevitably ensue.

Chemical History.—Benzoic Acid forms groups of needles and scales, flexible, exceedingly light, and of a brilliant white, satin-like luster. That prepared by the wet method appears as pale yellow needles. The odor accompanying ordinary Benzoic Acid is due to a volatile oil which adheres to the crystals; the pure acid is feebly acid, and somewhat acrimonious, odorless, but acquires a vanilla or benzoin odor by heat, volatile, inflammable, soluble in alcohol, ether, acetic acid, the mineral acids, oils, and alkaline solutions. It requires about 200 parts of cold, and 20 of boiling water for its solution. Heated in a platinum spoon it fuses, and is entirely converted into a white vapor, which, when inhaled, causes a peculiar pricking sensation in the throat. Its presence characterizes the true balsams. Its formula is $C_{14}\ H_5\ O_3$.

If Benzoic Acid contain *hydrochlorate of ammonia*, the addition of solution of potassa to it, will liberate ammoniacal vapors. When heated, should there be a residue, it is some foreign substance. Should the residue be carbonaceous, it may arise from the presence of *resin*, or the salt of some *organic acid.* If the acid has the odor of the sweat of a horse, *hippuric acid* is present, which may be known by the ammonia evolved, when the acid is mixed with lime and heated in a glass tube.

Properties and Uses.—Benzoic Acid appears to exert a stimulating influence on mucous surfaces, and has occasionally been serviceable in coughs and catarrhs. Taken internally it promotes the excretion of nitrogenous matter, the retention of which is the supposed cause of disease; and which matter appears in the urine in the form of hippuric acid. It does not affect the quantity of uric acid in the urine. Phosphatic urinary deposits are said to be removed by its use. It has also been recommended in gout and rheumatism, with or without carbonate of potassa, for preventing the tophaceous or urate of soda concretions. Externally, it has been used in the form of an ointment in some cutaneous diseases, and enters into some of the advertised lotions for beautifying the skin. It may be given in doses of from five grains to half a drachm. It enters into the Camphorated Tincture of Opium, and the Compound Ointment of Sulphur.

ACIDUM CARBAZOTICUM.

Carbazotic Acid.

Preparation.—Reduce the best Indigo to a coarse powder, and digest it with ten times its weight of hot Nitric Acid, of sp. gr. 1.43, added in small portions at a time. It dissolves with a copious emission of nitrous fumes, while it froths up very considerably. After the violent ebullition is over, raise it to the boiling temperature. Then add a little more concentrated Nitric Acid, continuing it from time to time as long as red fumes are disengaged. When the liquid has cooled, there will be deposited a great quantity of yellow-colored, semi-transparent crystals; and, supposing the process properly conducted, neither resin nor artificial tannic acid makes its appearance. Wash these crystals in cold water, and dissolve them in boiling water, and crystallize a second time. To obtain the Carbazotic Acid quite pure, dissolve these crystals again in boiling water, and saturate them with Carbonate of Potassa; on cooling crystals of carbazotate of potassa form. It is best to dissolve and crystallize them two or three times. When this salt is sufficiently pure, dissolve it in water and decompose it by nitric, muriatic, or sulphuric acid. When the solution cools, Carbazotic

Acid is deposited in beautiful crystalline plates. More of the acid may be obtained from the mother-waters by a similar process. Four parts of indigo yield about one part of Carbazotic Acid. Great care is necessary to obtain it free from indigotic and oxalic acids.

History.—Carbazotic Acid, also called *Picric Acid*, *Nitro-picric Acid*, *Welter's Bitter*, *Nitro-phenisic Acid*, *Nitro-phenolic Acid*, is the product of the action of strong nitric acid upon coumarin, indigo, salicin, carbolic acid, oil of gaultheria, and several other substances, aided by heat. It forms in whitish yellow prisms, with rectangular bases, which in thin layers are almost colorless. It reddens vegetable blues, and has an exceedingly bitter taste; it is fusible and volatile, and burns with a yellow flame, leaving a residue of charcoal. It is nearly insoluble in cold water, but soluble in hot water, alcohol and ether. It is not acted upon by chlorine, iodine, hydrochloric acid, nitro-hydrochloric acid, or cold sulphuric acid. It fuses at 284°, and stiffens to a fibrous, leafy mass. It colors the skin, hair, and especially animal membrane, yellow. It detonates by sudden heating. It forms salts with the bases, and these carbazotates also detonate in high temperatures. Its alcoholic solution is a good reagent for detecting the presence of potassa or soda; the carbazotate of potassa is sparingly soluble, and is deposited in minute yellow crystals; while the carbazotate of soda is very soluble. Its formula is $C_{12}\ H_2\ N_3\ O_{13} + H\ O$.

Carbolic Acid, or *Hydrated Oxide of Phenyl*, $C_{12}\ H_5\ O\ HO$, from which the preceding acid may be obtained, is found in that portion of coal-tar oil which boils between 300° and 400°. This is agitated with twice its volume of potassa lye, and the aqueous solution, on the addition of an acid, yields impure hydrated carbolic acid, which may be purified by rectification with a very little solid potassa. It is a colorless, oily liquid, refracting light powerfully, neutral to test paper, of a sharp, burning taste, a creosote odor, and a sp. gr. 1.062 to 1.065; it boils at 387°, burns with a yellow, smoky flame, is soluble in thirty-one parts of water at 63°, mixes in all proportions with alcohol and ether, dissolves sulphur, and is decomposed by chlorine, iodine, sulphuric and nitric acids. A splinter of pine wood, if dipped, first in carbolic acid, and then in moderately strong nitric, becomes of a deep blue, which soon passes into brown. Carbolic acid is highly useful as an antiseptic, and is very valuable in dissections, the difficulty of preserving the subject being effectually overcome by injecting carbolic acid mixed with water, and it does not materially affect the appearance of the tissues.

Properties and Uses.—Carbazotic Acid is tonic and astringent, the latter influence being effected by improving the general tone of the system. It has been efficaciously used in convalescence from acute diseases, cephalalgia, chronic diarrhea, gastric irritability, dyspepsia, anemia, and intermittent fever; in which last disease it is considered a valuable substitute for quinia. As the free acid is apt to occasion cramps in the stomach, the carbazotates of ammonia and iron have been found the best. The carbazotate of ammonia and gallic acid, one grain each, with one-sixth of a grain of opium, for a dose, and repeated three times a day in obstinate diarrhea. By the use of these agents the skin and conjunctiva become colored, so as closely to resemble jaundice, and would deceive the keenest observer; the acid has been detected in the urine, even when this has been kept several days. The dose of these is from half a grain to a grain, repeated three times a day.—*Moffatt*, *Grace-Calvert.*

ACIDUM CHROMICUM.

Chromic Acid.

Preparation.—To one volume or 100 measures of a cold saturated solution of Bichromate of Potassa add one volume and a half or 150 measures of pure Sulphuric Acid, and allow the mixture to cool in a covered capsule, or in a flask; the Sulphuric Acid unites with the Potassa, setting free a deposit of beautiful deep-red needles of Chromic Acid. The liquid being drained off, these are laid on a porous brick to dry, covered with a glass bell-jar. They must be preserved in very tightly stoppered vials.

Chemical Properties.—Chromic Acid is a strong acid, isomorphous with sulphuric, selenic, and manganic acids. It is very soluble in water, and is highly deliquescent in the air. It destroys the color of indigo, and of most vegetable and animal coloring matters. It is a powerful oxidizing agent, yielding half its oxygen readily to oxidizable bodies, and being reduced to sesquioxide. It is a teroxide of chromium, $Cr\,O_3$.

Properties and Uses.—Chromic Acid is recommended in the treatment of piles; the acid is to be applied freely over the whole of the diseased surface, and when properly managed it will not spread beyond the prescribed limits. It occasions uneasiness for some hours, and sometimes acute burning pain—a slough passes away, and the tumor shrinks and becomes insensible. As soon as its erosive operation is finished, the acid passes into a state of inert pulverulent sesquioxide. It may likewise be found advantageous in cancer, malignant tumors, ulcers, etc. It is less painful than other caustics.

The Bichromate of Potassa in saturated solution has been recommended as a local application to warts, excrescences, and tubercular elevations; it causes but little pain, and often removes these growths by absorption without any slough; or if a slough has formed, it serves to expedite the cure, and is not followed by deep, unmanageable ulcers.

When this salt is applied in solution to the skin, habitually, it first produces an eruption of papulæ, which become pustular, and, provided the exposure be continued, form deep sloughs under the pustules, of a peculiarly penetrating character.

A green ink may be made by dissolving 180 grains of bichromate of potassa in one fluidounce of water; add to the solution while warm, half a fluidounce of spirit of wine, then decompose the mixture with strong sulphuric acid until it assumes a brown color. Evaporate the liquid to one-half, let it cool, dilute it with two fluidounces of distilled water and filter it, then 'add half a fluidounce of spirit of wine, and a few drops of strong sulphuric acid, and let it stand. After some time the ink assumes a beautiful green color, and is rendered fit for use by the addition of a small quantity of Gum Arabic.

A very cheap ink, costing about two or three cents a gallon, may be made by neutralizing a solution of bichromate of potassa with salt of tartar (or until effervescence ceases). Then add a sufficient quantity of this to an infusion of logwood,.to give it the desired color. This ink, however, is apt to fade, and precipitates from the slightest causes; the smallest proportion of common black ink will cause a precipitate. To render the above ink perfectly permanent, and of a more intense black color, add to it a few drops of a solution of corrosive sublimate.

ACIDUM CITRICUM.

Citric Acid.

History.—Citric Acid is a vegetable acid found in the juices of many kinds of fruit, either free or combined with lime or potassa. The acid of commerce is usually obtained by saturating the juice of Limes or Lemons with Prepared Chalk; the white powder which falls to the bottom (citrate of lime) is separated by filtration, and then washed with warm water till the water passes off colorless. Dilute Sulphuric Acid is now added to the powder, the mixture boiled for some minutes, and then filtered to separate the resulting sulphate of lime. The liquid is evaporated to the consistence of syrup, and set aside to cool, when crystals of Citric Acid form.

Chemical Properties.—Citric Acid crystallizes in colorless, odorless, very sour, transparent, right-rhombic prisms, terminated by four planes, which are not altered by exposure to the air, and have the sp. gr. 1.617. They are exceedingly soluble in water, requiring 75 parts of cold and 50 parts of boiling water to dissolve 100 parts of the acid. The aqueous solution spoils by keeping. They are also soluble in alcohol or ether; and combine with alkalies, earths, and metallic oxides. Heated with nitric acid, Citric Acid becomes converted into the oxalic; also when heated with potassa. Its formula is $C_{12} H_5 O_{11} + 3HO$. Citric Acid is free from sulphuric acid when the deposit caused by the addition of a solution of chloride of barium is insoluble in nitric acid. It may contain tartaric acid as an adulteration, which may be known by cautiously adding to a solution of the suspected Citric Acid a solution of caustic lime; if tartaric acid be present a white precipitate, tartrate of lime, is formed, which is soluble in a solution of hydrochlorate of ammonia.

Properties and Uses.—This acid is used as a refrigerant and antiscorbutic. In all febrile diseases, a sweetened solution of it will be found a very beneficial draught, especially in those cases where the tongue is coated brown or dark; it may be flavored with a few drops of the essence of lemon. It is likewise beneficial in scurvy, acidity of the stomach, and some peculiar forms of sick headache. A lemonade powder, which will keep for years if preserved dry, is made by mixing together four ounces of powdered white sugar with three drachms of powdered Citric Acid and two drops of oil of lemon. Half a teaspoonful of this mixture may be dissolved in a tumbler of water, for a draught. The continued use of Citric Acid disturbs the functions of the digestive organs. It enters into the solution of Citrate of Potassa, Citrate of Iron and Quinia, Citrate of Iron, and Citrate of Quinia.

ACIDUM GALLICUM.

Gallic Acid.

Preparation.—"Take of Galls, in fine powder, *one pound*, mix them in a shallow porcelain or glazed dish, with sufficient water to form a thin paste. The mass is to be frequently stirred, and allowed to stand for several months (renewing the water as it evaporates), until the filtered solution of a portion, previously mixed with water, gives no precipitate with a solution of gelatine; the temperature at which the mass is kept should be between 60° and 70° F. If on testing with gelatine solution, only a slight turbidness ensues, this will not be of consequence, as the tannic acid present will eventually remain in the mother liquid. The mass is now to be mixed with at least eight times its weight of water, boiled for half an hour, the gray or blackish solution strained through a thick linen cloth, and the residue well washed with hot water. The whole of the filtered liquids are now to be evaporated in the same porcelain vessel, previously cleaned, until of the thickness of syrup; then mixed with about one-quarter of a pound of finely powdered wood charcoal, and carefully evaporated to dryness. The dried mass is to be powdered and digested in the sand-bath with four times its weight of alcohol, of at least 80 p. ct., filtered while warm, and again digested with the same quantity of alcohol; the filtered yellow alcoholic solutions are mixed with some water, and then distilled from a retort, in order to recover the alcohol. The crystalline pasty mass is rinsed out into a dish, and so much water added that on heating it forms a solution, which is to be quickly filtered and placed in the cold. After several days the crystalline mass is pressed, and purified by dissolving several times in hot water and crystallizing. Rather more than one-third of the weight of galls used is thus obtained in Gallic Acid.

"Gallic Acid does not exist in galls ready formed, but is produced, together with carbonic acid, by the action of the atmospheric oxygen on the tannic acid contained in them. One equivalent of tannic acid absorbs eight equivalents of oxygen, and forms two equivalents of Gallic Acid, six of water, and four of carbonic acid. 2650 parts of tannic acid must, therefore, form 1638 parts of Anhydrous Gallic Acid, or 2363 parts of crystallized acid combined with three equivalents of water. So much as this is, however, never obtained in practice, because during the digestion of the gallnuts with water, a portion of the first-formed Gallic Acid becomes converted into a gray or black carbonaceous body. To separate this entirely, the watery extract must be treated with alcohol, in which this foreign body is insoluble, and the charcoal powder is added to dry and powder the extract more readily, as well as to decolorize the product."— *Witt.*

Kent has extracted Gallic Acid from ink by ether. Wetherill procured an abundant crop of Gallic Acid, by adding to tannic acid thirteen drachms, sulphuric acid twenty-two fluidounces, and quadruple this volume of water; this mixture was raised to a temperature of 212° F., and then set aside for a few days. He supposes that the difference between tannic and Gallic Acids consists entirely in the excess of water contained in the former acid. *Am. Jour. Pharm.* xx: 12. More recently the opinion has been advanced by some chemists, that galls contain a principle (pectose) which produces the transformation of their tannic acid into gallic. It is not yet satisfactorily determined whether tannic acid contains saccharine matter or not, as stated by Strecker; but if such should be found the case, it is probable that the principle in galls, above referred to, occasions a fermentation with the saccharine substance, the decomposition effected thereby resulting in alcohol and carbonic acid, at the same time setting the Gallic Acid free.

History.—Gallic Acid forms white, satiny, needle-like crystals, odorless, of a sweetish, acid, styptic taste, and which entirely sublime when heated, forming the so-called *Pyro-gallic* acid, which is crystallized Gallic Acid, minus one equivalent each, of water and carbonic acid. Gallic Acid dissolves in one hundred parts of temperate water, but much more readily in hot water, as well as in alcohol; it is also tolerably soluble in ether. When acted upon by the atmosphere, it absorbs oxygen, becomes dark-colored, and decomposes. Neither gelatin nor the ferruginous protoxides are affected by it; but the ferruginous sesquioxides form a bluish-black precipitate with it. If a solution of gelatine is rendered turbid by it, tannic acid is present. It combines with all bases, and gives in part crystallizable salts; boiled with acid carbonate of lime, it is converted into *Gallerythric acid.* Its formula is $C_7 H_3 O_5$, and its atomic weight 85.

Pyrogallic Acid is a crystallizable volatile acid, more soluble in water than Gallic Acid, colorless, odorless, produces a deep-blue color with the protosalts of iron, and absorbs oxygen, which converts it into a dark-brown substance, insoluble in water or alcohol. When galls undergo dry distillation, a sublimate and a fluid are formed, which form impure Pyrogallic acid; this dissolved in distilled water, the solution decolorized by animal charcoal, concentrated by evaporation, and mixed with alcohol and some essential oil, forms a permanent hair-dye, giving to the hair a dark-brown color; it must be used with care, as it stains the hands. The formula of Pyrogallic Acid is $C_6 H_3 O_3$; and when it is sublimed it forms *Metagallic Acid* $C_{12} H_3 O_3$.

Properties and Uses.—Gallic Acid is much inferior to tannic acid as a topical astringent; but, administered internally, it is more powerful as a remote astringent. Indeed, tannic acid in its passage through the system, becomes changed into Gallic Acid. As a remote astringent, Gallic Acid has been found very beneficial in uterine, pulmonary, and nephritic hemorrhages. Menorrhagia has promptly ceased under its use. It has also been found useful in chronic mucous discharges from the bowels or bladder, and has some reputation in arresting the excretion of albumen in Bright's disease of the kidney. Costiveness is not produced by its use. Its dose is from three to twenty grains, three times a day, or oftener; it may be used in the same form as tannic acid.

ACIDUM HYDRIODICUM.

Hydriodic Acid.

Preparation.—Hydriodic acid prepared according to the following formula of Dr. A. Buchanan of Glasgow, is, according to its originator, possessed of all the therapeutical powers of iodine, without its irritating properties. Dissolve 330 grains of Iodide of Potassium in a fluidounce and a half of Distilled Water, and to this add 264 grains of Tartaric Acid, also dissolved in a fluidounce and a half of Distilled Water. When the bitartrate of potassa formed has subsided, filter, and to the filtered liquor add sufficient water to make fifty fluidrachms.

History.—Hydriodic Acid is a transparent, colorless liquid, of an acid taste and suffocating odor; its specific gravity is 4.385, and its formula HI. It is decomposed by the air, and gradually becomes darker or red, from dissolving the disengaged iodine. According to the above method a small portion of bitartrate of potassa is held in solution with it, but not enough to render it objectionable.

Properties and Uses.—This acid may, according to Dr. Buchanan, be used in doses of five drops, gradually increased to a fluidrachm, in all cases where iodine is indicated. It should be sufficiently diluted with water, when given, to render it pleasantly acid, and the dose may be repeated two or three times a day. Hydriodic Acid forms salts with the vegetable alkaloids. Sixty drops of the acid is equal to five grains of iodine.

ACIDUM HYDROCHLORICUM.

Hydrochloric Acid. Muriatic Acid.

Preparation.—Hydrochloric Acid, also called *Spirit of Sea-salt*, is obtained from muriate of soda by the decomposing power of sulphuric acid, which unites with the soda to form sulphate of soda, and at the same time liberates the hydrochloric acid in the form of gas; and this is passed into vessels containing water, which absorbs 480 times its volume of the gas and forms the liquid acid.

Chemical Properties.—Hydrochloric acid is a colorless, invisible, pungent gas, forming white fumes in the air, in consequence of its affinity for aqueous vapor. When in solution, it is a transparent fluid, of a pungent smell and taste, evolves acid fumes in the air, and varies in specific gravity from 1.11 to 1.21. If the acid has a yellow color, this is due to the presence of some organic matter, though it is usually attributed to iron; but sufficient of this metal is never present alone to cause it. Iron may be detected by supersaturating the acid with ammonia, when the hydrated oxide of iron will be thrown down in brown flocks. If the ammonia does not throw down a flocculent brown precipitate, instantaneously, let the liquid stand in the test-tube for an hour, and then add sulphuret of ammonium, when the black sulphuret of iron will be formed. Tannic acid will produce a violet or bluish-black tannate of iron. If the acid is reddish, *selenium* is present. When *sulphuric acid* is in combination with the Hydrochloric, a solution of nitrate of baryta added to the suspected acid diluted with five or six times its volume of water, will cause a heavy white precipitate of sulphate of baryta, which is insoluble in nitric acid. Sometimes *chlorine* exists in the acid in a free state; it colors the liquid yellow, and may be detected by its decolorizing a solution of sulphate of indigo, and also by its enabling the acid to dissolve leaf-gold. If to the solution containing the gold a solution of protochloride of tin be added, a purplish-red precipitate is formed. *Sulphurous acid* is detected by protochloride of tin, which, after some time, yields a yellow, then a brown precipitate of sulphuret of tin; or, place a piece of pure zinc into the acid, and conduct the gas evolved into a solution of acetate of lead, when a black precipitate will be formed. *Lead* may be detected by the black precipitate occasioned when sulphureted hydrogen is passed into the acid. *Arsenic* may be ascertained, when present, by Marsh's test. The formula for Hydrochloric Acid is $H\,Cl$, its combining number 36.42.

Properties and Uses.—Concentrated Hydrochloric Acid is occasionally used as a topical application to cancrum oris, some obstinate ulcers of the tongue, in certain syphilitic and mercurio-syphilitic diseases, in phagedenic ulceration, and also in chilblains or frost-bites. Internally, it is always diluted, so as to reduce its specific gravity to about 1.045, and which may be effected by adding one fluidounce of the strong acid to three fluidounces of distilled water. The dose of this varies from ten drops to a fluidrachm, which should be added to four or six fluidounces of water, and sucked through a quill or glass tube, to prevent its injuring the teeth. The dilute acid has been used as a gargle for elongated uvula, aphthæ, and sore-throat of scarlatina. Internally it has been administered in typhus and typhoid febrile diseases, malignant scarlet fever, some forms of dyspepsia, and in torpor of the liver; also as a tonic in cases of phosphatic urine.

Chalk, whiting, magnesia, soap, and oil are the antidotes to poisonous doses of Hydrochloric Acid, combating the gastro-enteritis in the usual way.

It enters into the Nitro-Muriatic Acid; Chloride of Calcium; Muriate of Morphia; Muriate of Quinia; Tincture of Chloride of Iron; Ointment of Muriatic Acid; and Cyanuret of Potassium.

ACIDUM HYDROCYANICUM.

Hydrocyanic Acid. Prussic Acid. Cyano-hydric Acid.

Preparation.—"Dilute Sulphuric Acid *one ounce and a half* with Distilled Water *four fluidounces* in a tubulated glass retort, and when cooled, add Ferrocyanuret of Potassium *two ounces*, dissolved in Distilled Water ~~*eight*~~ *fluidounces.* too much HCl Pour Distilled Water *eight fluidounces* into a cooled receiver, and having adapted this to the retort, with a gentle sand-bath heat distil six fluidounces. Dilute the product with *six fluidounces* more of water, or so that 100 grains shall exactly saturate 12.7 grains of nitrate of silver dissolved in distilled water.

"Diluted Hydrocyanic Acid may also be prepared, where it is to be more quickly used, by agitating in a close vial *nine grains and a half* of Cyanide of Silver, *nine minims* of diluted Hydrochloric Acid, and *one fluidounce* of Distilled Water, and then pouring off the clear liquid after a short interval. This acid ought to be kept excluded from light."—*Lond.*

There are several other modes of preparing the medicinal Hydrocyanic Acid, but those given above, from the London Pharmacopœia, will be found to yield a good article. According to Mr. Everitt, six equivalents or 294 parts of sulphuric acid react on two equivalents or 426 parts of crystallized ferrocyanuret of potassium [composed of 4 eqs. cyanide of potassium, 2 cyanide of iron, and 6 of water], and produce three equivalents or 384 parts of the bisulphate of potassa, three equivalents or 81 parts of Hydrocyanic Acid, one equivalent or 174 parts of a new salt (*biferrocyanuret of potassium*), and nine equivalents or 81 parts of water. The bisulphate and the new salt remain in the retort, while the Hydrocyanic Acid with some water distil over. In the above formula an additional quantity of water is employed to assist the condensation of the acid.—*P.*

Chemical History.—Concentrated or anhydrous Hydrocyanic Acid is not used in medicine. The medicinal acid is a clear fluid, having a peculiar, penetrating, diffusive odor, and a peculiar, rather disagreeable taste. It is very poisonous, is very volatile, imparts a slight red tinge to litmus paper which is not permanent, and is decomposed by the action of light. Vials in which it is placed should be well stopped, and covered with some dark, opaque varnish, paint, or other substance which will exclude the light. If the acid strongly reddens litmus it contains some other acid; if it be *sulphuric acid*, a solution of nitrate of baryta, which occasions no precipitate in the pure acid, will yield a white deposit of sulphate of baryta insoluble in nitric acid. If *hydrochloric acid* be present, nitrate of silver forms a white deposit of chloride of silver insoluble in boiling nitric acid, whereas the white cyanide of silver is soluble in nitric acid at 212°. These acids are objectionable only inasmuch as they render it difficult to determine the strength of the Hydrocyanic Acid.

Hydrocyanic Acid may be known: 1. By its peculiar odor; 2. by its forming Prussian blue when, after having accurately saturated it with caustic potassa, a solution of sulphate, or tincture of muriate of iron is added to it, and to the precipitate thus procured some dilute sulphuric or hydrochloric acid be added; 3. the white precipitate of cyanide of silver, caused by the addition of a solution of nitrate of silver, is soluble in boiling concentrated nitric acid; 4. when the suspected acid is small in quantity, place the article in which it is supposed to exist, in a small watch-glass, and over the top of this accurately adjust a larger one, in the center of which has been placed a drop or two of a solution of hydrosulphate of ammonia containing an excess of sulphur. In three or four minutes remove the upper watch-glass, and gently dry the moistened spot over a spirit-lamp, which will leave a white film; moisten this with a drop of water, and then allow a drop of solution of persulphate or perchloride of iron to fall upon it; if Hydrocyanic Acid was present in the suspected substance a blood-red-colored liquid appears, which color is removed by the addition of one or two drops of corrosive sublimate.—*P.*

Hydrocyanic Acid is *incompatible* with the mineral acids; the salts of iron, the sulphurets, chlorine, the oxides of mercury, of antimony, nitrate of silver, etc.

Properties and Uses.—Hydrocyanic Acid is a very active and powerful poison; but when diluted it has been employed in medicine as a sedative to subdue spasm, and allay nervous irritability. It has been used to relieve severe vomiting and purging, to check colliquative diarrhea, to cure pertussis and spasmodic coughs, asthma, hysteria, chorea, dyspepsia connected with morbid irritability of the stomach, etc., also externally several diseases of the skin. But, from its volatility, its variability of strength, and its proneness to decomposition, it will very frequently disappoint the expectations of the practitioner, either by inducing fatal symptoms, or being wholly inert. The dose of the dilute acid is from one to five drops in water, mucilage, or syrup.

In cases of poisoning by Hydrocyanic Acid, there is seldom time to administer an antidote; but when life is not extinct, we may confidently rely on the antidotes we possess. The best is that proposed in the Lancet for 1844, vol. II., p. 41, by Messrs. T. & H. Smith, of Edinburg, viz.: In a fluidounce or two of water, dissolve carbonate of potassa twenty grains, and cause the patient to swallow it; and, immediately following this, administer a solution of protosulphate of iron ten grains, tincture of chloride of iron a fluidrachm, in a fluidounce of water. This will convert about two grains of the strong acid into an insoluble Prussian blue. While these are being prepared, the symptoms already produced will be best combated by ammonia inspired from a sponge, or taken, diluted, internally; by chlorine water, used by inhalation, and internally, in teaspoonful doses, diluted with water; cold affusion, dashing the water more especially on the head and along the spinal column; and also artificial respiration.

ACIDUM LACTICUM.

Lactic Acid.

Preparation.—To six pints of Milk, add eight ounces of Bicarbonate of Soda. Expose it to the air for some days, till it becomes sour, and saturate it with more Soda. Repeat this, as often as it becomes acid. Boil, filter, and evaporate to the consistence of syrup, and digest with Alcohol. Filter the solution, and add Sulphuric Acid as long as it occasions a precipitate. Again filter, and concentrate the clear solution by evaporation, till its density is 1.215.

Another mode of preparing this acid is, according to A. Beusch, to dissolve Cane-Sugar six pounds, and Tartaric Acid half an ounce, in Boiling Water twenty-six pounds, and set it aside for some days; upon this, old stinking Cheese eight ounces, well diffused in curdled acid Milk from which the cream has been removed, are to be added to the above mixture along with finely-powdered Chalk three pounds, the whole to be kept in a warm place, so that the temperature of the liquor shall be from 86° to 95°. It must be well stirred several times every day; in the course of from eight to ten days the entire mass will solidify to a stiff paste of lactate of lime; to this paste are to be added, Boiling Water twenty pounds, and Caustic Lime half an ounce, then boil for half an hour, and filter through a linen bag. The liquid is then to be evaporated to the consistency of a syrup, and set aside for four days, in which time the lactate of lime will separate in a granular crystalline form; it must then be expressed, agitated with one-tenth its weight of cold water, again submitted to pressure, and this operation to be repeated two or three times.

The lactate of lime, after being expressed as well as possible, is dissolved in twice its weight of Boiling Water; and for every pound of expressed lactate of lime, three and a half ounces of Sulphuric Acid previously diluted with its weight of Water, must be added to the solution. The hot liquid is to be immediately filtered from the precipitated gypsum, through a conical bag, then boiled with Carbonate of Zinc one and three-eighth pounds for every pound of sulphuric acid which has been used; it must not be boiled longer than a quarter of an hour, if over this time, a very insoluble basic salt is formed. The solution, filtered boiling hot, soon deposits perfectly colorless lactate of zinc in crystalline crusts, which may be obtained perfectly free from sulphuric acid by rinsing with cold water. The mother-ley is to be again boiled with any of the salt which may have remained on the strainer, or concentrated by evaporation. It yields nearly to the last drop, perfectly white lactate of zinc.

To separate the Lactic Acid from this salt, dissolve it in seven and one-half parts of Boiling Water, pass a current of Sulphureted Hydrogen into the hot liquid until it has become cold and no further separation of sulphuret of zinc can be perceived. The liquid filtered from the sulphuret of zinc is to be boiled to expel the excess of sulphureted hydrogen, and then evaporated in a water-bath to the consistence of syrup. Eight parts of lactate of zinc yield, in this manner, five parts of perfectly pure Lactic Acid.

The separation of the Lactic Acid may likewise be accomplished by adding barytic water, which produces lactate of baryta, and precipitates the oxide of zinc; the addition of sulphuric acid removes the baryta, and the filtered liquid is pure diluted Lactic Acid, which must be concentrated by evaporation, in vacuo.

The acid of sour-crout is Lactic Acid, and by boiling it with carbonate of zinc, lactate of zinc may be obtained.

Chemical Properties.—Hydrated Lactic Acid ($C_6 H_5 O_5 + HO$,) is a clear, thick fluid, of a very strong but pleasant acid taste, no odor unless heated, non-crystalline, and when dry forms a smooth varnish which gradually absorbs moisture from the air. It is soluble in water, forms soluble salts with the bases, coagulates albumen, and has the sp. gr. 1.215. According to Gregory, the hydrate is decomposed at 482° F., and yields a solid crystalline sublimate, $C_6 H_4 O_4$, which has been called anhydrous or sublimed Lactic Acid; this compound dissolves readily in hot water, and the solution if evaporated yields the original hydrate. The hydrated acid is inodorous, attracts moisture when exposed to the air, and is dissolved in all proportions by water or alcohol. It quickly dissolves oxalate of lime, and phosphate of lime, especially that which is contained in the bones, and hence has been recommended in oxalic and phosphatic urinary deposits. It is not employed in medicine in its uncombined state, but is used in the preparation of Lactate of Iron and Lactate of Quinia. According to Pereira this acid was introduced into medicine by Magendie, who suggested its employment in dyspepsia, and in phosphatic urine. It has recently been advised in gout. The dose is from half a drachm to two drachms, in sweetened water, or in the form of lozenges.

ACIDUM NITRICUM.

Nitric Acid. Aqua Fortis.

Preparation.—Nitric Acid is generally procured by submitting to distillation either Nitrate of Potassa or of Soda with Sulphuric Acid,—the soda or potassa unites with the sulphuric acid to form a sulphate, while the Nitric Acid is liberated in the form of gas, which is passed into a vessel of water, this fluid absorbing it and acquiring acid properties. According to Deville, dry or uncombined Nitric Acid may be obtained by decomposing dry nitrate of silver by dry chlorine gas. It forms large, brilliant, colorless crystals, belonging to the right-rhombic prismatic system, which fuse at 85°, boil at 113° F., have the formula NO_5, and equivalent weight 54.

Chemical History.—Nitric Acid is met with of various strengths, as follows:

1. The *most concentrated* or *Monohydrate*, called also *Hydrate of Nitric Acid*, *Nitrate of Water*, etc., is a transparent and colorless fluid, of an intensely acid, corrosive taste, and emitting gray fumes of an irritating, peculiar odor. From the presence of hyponitric acid it is commonly of a deep golden yellow color, but this acid may be dissipated and the Nitric Acid rendered colorless by boiling. The fumes arise from the great eagerness of the acid to seize more water; so soon as the acid vapors meet with aqueous vapors in the air, they condense, and combine with them, forming very minute drops of water and acid. These fumes redden litmus, and become white when mixed with ammoniacal vapor, forming nitrate of ammonia. Nitric Acid boils at 248°, concretes at —50° F., and is of sp. gr. varying from 1.50 to 1.54. It is easily deoxidized, evolving oxygen and developing nitrous acid, as known by its yellowish or brownish color, when exposed to the action of light. Nitric Acid decomposes vegetable and animal tissues, and communicates a permanent yellow stain (xanthoproteic acid) to the skin, which becomes orange-colored on the addition of alkaline soap. The facility with which it parts with a portion of its oxygen to all combustible or oxidizable bodies, renders it an energetic oxidizing agent, and very useful in effecting decomposition of organic matters, and chemico-solutions of metals. When combined with hydrochloric acid, it forms Nitro-hydrochloric acid or Aqua Regia, in which liquid gold is soluble. Nitric Acid changes morphia to a red or yellow color, and is itself changed to a blood-red color by the addition of brucia. When left open to the air it absorbs moisture and becomes weakened. Its formula is $NO_5 + HO$, and its equivalent 63.268. Its most important salts are the nitrates of potassa, soda, silver, strontia, copper, lead, mercury, etc.

Nitric Acid is found in both the organized and inorganized world in combination with soda, potassa, lime or magnesia, as in the juices and tissues of vegetables, in earths, mineral waters, etc., and is found in rainwater after a thunder storm.

2. *Concentrated Nitric Acid*, or *Second Hydrate*, also called *Nitrous Acid*, *Fuming Nitric Acid*, etc. From the nitrous acid it contains, it is usually of a yellowish color, and evolves yellowish vapors, but may be rendered colorless by boiling, which dissipates the nitrous acid. Its sp. gr. varies from 1.41 to 1.45. The nitrous acid fumes evolved are very unpleasant and suffocating, and can not be breathed with impunity even for a moment. Concentrated Nitric Acid is more corrosive than the preceding kind, giving out its oxygen more readily; it congeals into a dark-red mass at—56° 2′, F.

3. *Double Aqua Fortis* is an impure Nitric Acid, containing nitric and hyponitrous acids, and is used by jewelers and color-makers; its sp. gr. is 1.36.

4. *Single Aqua Fortis*, is principally employed by dyers for dissolving tin; it is still weaker than the preceding, having the sp. gr. 1.22 to 1.25.

Pure Nitric Acid ought to be entirely volatile; and when diluted with distilled water, to give no precipitate with the salts of baryta or of silver. Its presence in a liquid is best ascertained by adding at least one-fourth its volume of pure sulphuric acid, and then when the mixture is cold, a drop or two of solution of protosulphate of iron; if Nitric Acid be present a purplish or brownish color will appear where the two liquids meet,—and by this test $\frac{1}{24000}$ of Nitric Acid may be detected.

Nitric Acid is frequently rendered impure by the presence of sulphuric, hydrochloric, or nitrous acids. The latter imparts to it a yellow or orange color, and may be removed by boiling the acid. *Sulphuric acid* may be detected by diluting the nitric acid with eight times its volume of distilled water, and then adding a few drops of solution of chloride of barium, which will give a white precipitate, if sulphuric acid be present. If a solution of nitrate of silver be used, instead of the barium, it will give a white precipitate, if *hydrochloric acid* be present. Sometimes, when these foreign acids are not present in large quantity, instead of a precipitate a mere white cloud will be observed, in either of the above cases. Occasionally, *iodine* is contained in the acid of commerce, which may be detected by adding a carbonated alkali to the acid, to saturation, then adding a small quantity of a solution of starch, and lastly three or four drops of sulphuric acid, which will produce a blue tinge if iodine be present.

When Nitric Acid is added to a solution of glue, it prevents it from forming a jelly, and makes what is called a liquid glue, which is very convenient for cabinet-makers, joiners, pasteboard-workers, toy-makers, etc., inasmuch as it is applied cold. The liquid glue is made by taking two and one-fifth pounds of good glue, and dissolving it in two and one-ninth pints of water, in a glazed pot over a gentle fire, or still better, in the water-bath, stirring it from time to time. When all the glue is melted, pour in, in small quantities at a time, of nitric acid specific gravity 1.32, seven ounces avoirdupois. This addition produces an effervescence, owing to the disengagement of hyponitrous acid. When all the acid is added, remove the vessel from the fire, and allow it to cool. This preparation preserves nearly all the primitive qualities of the glue, may be kept in an open vessel for years, without undergoing any change, and will be found very convenient in chemical operations; gases may be preserved by it, by covering strips of linen with it.

Properties and Uses.—Nitric Acid is a corrosive poison, and is never used internally, unless very much diluted. The London Pharmacopœia give a formula for Diluted Nitric Acid as follows: "Take of Nitric Acid (the second hydrate), *three fluidounces;* Distilled Water, seventeen fluidounces, or enough to render the specific gravity 1.08. One fluidounce of this mixture is saturated by 154 grains of crystallized carbonate of soda. Its dose is from ten to fifty drops in four or six fluidounces of water; it should be sucked through a quill or glass-tube, to prevent its injuring the teeth, and the mouth should be rinsed with an alkaline solution immediately after each dose. Internally, it is refrigerant, expectorant and antisyphilitic." A refreshing acidulous draught is formed by making a very dilute, sweetened, solution of Nitric Acid, which is useful in fevers, especially when there is a disposition to prostration or putrescency; it has likewise been recommended in hepatic and syphilitic affections. Dr. Gibbs recommends the following mixture as very valuable in hooping-cough: Take of diluted Nitric Acid, twelve fluidrachms; compound tincture of Cardamom, three fluidrachms; simple Syrup, three and a half fluidounces; Water, one fluidounce. Mix. For a child one or two years old, a teaspoonful may be given every hour or two, washing the mouth out immediately after with some alkaline solution, to prevent the teeth from being injured. He says the acid supplies the blood with nitrogen, which neutralizes the excess of fibrin that exists in the blood in hooping-cough. Ten or twenty drops of the acid added to a pint of water, forms a useful wash for sloughing and other ill-conditioned ulcers, and in various chronic eruptions, porrigo of the scalp, etc. Concentrated Nitric Acid has been used externally for several purposes, as the destruction of warts, cauterization of poisoned wounds, and in phagedenic ulcerations, in which the acid should be brought in contact with the living surface.

In the treatment of piles, Nitric Acid is said to be very efficacious; the small tumors may be destroyed by a single application of it, while the larger may require two or three applications. If the tumors can not be extruded from the anus, a speculum must be used. The acid may be applied by a bit of sponge not larger than a grain of wheat, attached to a gold or glass probe. The severe pain which usually follows may be relieved by morphia exhibited internally, and lard, or opiate suppositories applied locally. If too much acid has been applied, extending to contiguous parts, and causing unnecessary pain, it may be neutralized by applying a piece of sponge or cotton, saturated with soda or potassa. Dr. Dixon expresses a hope, grounded on the successful results of its application, that all cases of piles may thus be cured, with greater certainty than by excision or ligation.

For several years past I have used Nitric Acid as a local application to chancre in hundreds of instances, and have not yet heard of any return of the disease, either in a secondary or tertiary form. It must be applied while the chancre is in the pustular form, and unbroken, and before the virus is acted upon by the oxygen of the atmosphere, and consequently, previous to its absorption in the system. As soon as the pustule is discovered, the physician will open it, and apply several drops of undiluted Nitric Acid to it, thus destroying the virus at once, and curing the disease in a few minutes. The pain occasioned is hardly noticed by some patients. Sometimes, I subsequently wash the ulcer with the muriated tincture of iron, which is one of the best local applications to a chancre with which I am acquainted. No other treatment is required, unless for the purpose of allaying the patient's fears. Since having introduced this employment of the acid to the profession, many have employed it, and uniformly with successful results.

When swallowed internally, without dilution, Nitric Acid proves fatal; the same means may be employed to counteract its effects, as named for hydrochloric acid.

Off. Prep.—Acidum Nitro-muriaticum; Acidum Nitricum Dilutum; Spiritus Ætheris Nitrici; Unguentum Acidi Nitrici.

ACIDUM NITROHYDROCHLORICUM.

Nitrohydrochloric Acid.

NITROMURIATIC ACID. AQUA REGIA.

Preparation.—The usual form for preparing this acid is to combine one part, by measure, of Nitric Acid, with two parts of Hydrochloric Acid; but as I introduce it here merely because it enters into the formula for the *White Liquid Physic*, given below, I will state that in this instance it should be made of *equal parts* of Nitric and Muriatic Acids.

This acid promptly dissolves gold, and as it readily parts with its chlorine, it, together with its preparations, should always be preserved in close bottles.

Properties and Uses.—Similar to the above mineral acids. Bathing with a dilute solution of this acid, say one part of acid to six of water, is asserted to have cured several cases of obstinate constipation. Dose, three or four drops, sufficiently diluted.

A preparation has been highly recommended, called *White Liquid Physic*, or *Dow's Physic*. It is made as follows: Take Sulphate of Soda, *half a pound;* Water, *one and a half pints;* dissolve, and then add, Nitromuriatic Acid, *two fluidounces*, Powdered Alum, *one drachm and eight grains.*

This preparation is used as a cooling purgative, also to allay nausea and vomiting—for colic, hepatic diseases, diarrhea, etc. Given by some as a substitute for mercury. In intermittent fever, given in laxative doses, it has proved highly beneficial, especially when occurring in broken-down constitutions, and has cured the most obstinate cases of dysentery. Dose, one tablespoonful in a gill of water, three times a day; or, in dysentery, given every hour, until it slightly operates on the bowels, after which, every three or four hours. The above is the original recipe, and the additions of sanguinaria, etc., are uncalled for.

A preparation which is highly recommended for the cure of corns, warts, cancers, etc., Dr. Bleeker's remedy, is said to be a compound of nitromuriatic acid and cobalt.

ACIDUM OXALICUM.

Oxalic Acid.

History.—Oxalic Acid was discovered by Scheele, and is met with in the organic, as well as in the inorganic kingdoms. In plants it is generally met with in combination with lime or potassa; rhubarb, rumex acetosa, oxalis acetosella, etc., contain the oxalate of potassa; rhubarb also contains oxalate of lime, as likewise do many lichens, and, in the human being, it forms the mulberry calculus, a form of gravel frequently met with. It may also be formed artificially by the action of nitric acid on sugar, starch, gum, wool, and many other organic compounds, which are free from nitrogen.

Preparation.—There are several methods by which Oxalic Acid may be procured, the following are considered among the best: 1. Gently heat one part of pure Starch with eight parts of Nitric Acid of sp. gr. 1.20 or 1.25. A powerful reaction ensues with an evolution of red nitrous acid vapors; when this diminishes, heat must be applied, and continued until no more red vapors are given off; if sufficiently evaporated, a large quantity of crystals of hydrated oxalic acid are deposited as the liquid cools. These are dried on a porous tile, then dissolved in a little Hot Water, and pure Oxalic Acid is deposited as the solution cools. The mother liquor remaining after the first deposit of crystals contains much free nitric acid, saccharic acid, and other products. 2. Digest one pint of Sugar dried at 212° F., with 8.25 pints of Nitric Acid of sp. gr. 1.38. Evaporate the mixture to a sixth, and leave to crystallize. This process requires but an hour or two, and yields from 50 to 60 per cent. of handsome crystals. 3. Add 144 parts of Nitric Acid (made by mixing the acid of commerce with ten parts of water), very gradually and portionwise, to 24 parts of Starch, and after the reaction ceases, apply gentle heat. When nitrous vapors cease, set aside to crystallize. This process yields 12 parts of acid. Upon further treatment with nitric acid, the mother liquor will yield more.

Chemical Properties.—Oxalic Acid crystallizes in colorless, transparent, oblique, quadrilateral prisms with two-sided summits, of composition C_2, $H_3 + 3HO$, and specific gravity, 1.507. The crystals are inodorous, have a strongly acid taste, faintly effloresce in a dry atmosphere, redden litmus paper, and when pure are completely volatilized by heat, and without becoming blackened. They dissolve in from eight to eleven parts of water at 60° F., in their own weight of water at 212° F., and in four parts of alcohol; the addition of a small quantity of nitric acid to the water causes it to dissolve them more readily. Nearly all the oxalates are insoluble in water, excepting the alkaline. Oxalate of lime is insoluble, and hence Oxalic Acid is useful as a test for lime, and is usually employed in the form of oxalate of ammonia; if the liquor to be examined contain any free acid, this must first be neutralized, as the oxalate can only detect lime in neutral or alkaline fluids.

Oxalic Acid may be detected in any solution, by being entirely volatilized by heat; by yielding a white precipitate with nitrate of silver, soluble in nitric acid; and by giving a white precipitate with lime-water, which is insoluble in water, readily soluble in nitric acid, and which, when dried and heated to low redness, is converted, without blackening, into carbonate of lime. Solution of sulphate produces a bluish-white precipitate with Oxalic Acid.

Oxalic Acid is sometimes contaminated with nitric acid, which gives a faint odor to it, and stains the cork of the bottle in which it is kept, yellow. If a very dilute solution of sulphate of indigo, containing the impure crystals, be boiled, the nitric acid present will decolorize the solution.

Properties and Uses.—This article is a poison, and an unfit agent for internal administration. For a number of years past I have used a saturated aqueous solution of it as an external application in cutaneous cancer, acne, scald-head, and several forms of cutaneous disease, since which, on my recommendation, others have employed it with success in similar affections, sometimes alone, and again with a small portion of creosote added. The saturated solution neutralized by caustic potassa, forms an excellent application to discuss indolent tumors. The acid may likewise be used for removing iron-mold from linen, ink-stains, and is employed in calico printing as a bleaching and discharge agent.

Poisoning by Oxalic Acid, oxalate of ammonia, or oxalate of potassa, is best remedied by the speedy administration of chalk, suspended in water; when chalk can not be had magnesia may be used; either of these form insoluble oxalates. When this acid is taken in poisonous doses, it operates quickly.

ACIDUM PHOSPHORICUM DILUTUM.

Diluted Phosphoric Acid.

Preparation.—Take of Phosphorus, *an ounce;* Nitric Acid *four fluidounces;* Distilled Water *ten fluidounces* (imperial measure). Add the phosphorus to the nitric acid, mixed with the water in a glass retort placed in a sand-bath; then apply heat until eight fluidounces are distilled. Put these again into the retort, that eight fluidounces may distil, which are to be rejected. Evaporate the remaining liquor in a platinum capsule until only two ounces and six drachms remain. Lastly, add to the acid, when it is cold, as much distilled water as may be sufficient to make it accurately measure twenty-eight fluidounces. One hundred grains of it saturate forty-two grains of carbonate of soda.—*Lond.*—*C.*

Chemical Properties.—Phosphoric acid prepared according to the above formula, is a transparent, odorless fluid, of sp. gr. 1.064, having an agreeable but intensely acid taste, reddening litmus paper, and forming salts with alkalies, earths, and metallic oxides. The diluted acid concentrated to the consistence of molasses, forms *Hydrated Phosphoric Acid;* when this is exposed to a greater heat, it loses water, and becomes *Pyrophosphoric Acid*, $2\ HO, PO_5$; and at a dull red heat it forms *Metaphosphoric Acid*, HO, PO_5, which is fusible, and by cooling forms a transparent solid called Anhydrous or *Glacial Phosphoric Acid*, PO_5. The Anhydrous Acid forms snow-white porous volatile flakes, rapidly absorbs moisture from the air, loses its volatility, and becomes converted into a tough mass; if it be colored yellow, phosphoric oxide is present.

Molybdate of ammonia, made by dissolving molybdic acid in excess of ammonia, is a test for phosphoric acid, detecting even traces of it; it forms with this acid a bright yellow precipitate, the quintimolybdate of ammonia. If Dilute Phosphoric Acid be saturated by ammonia, nitrate of silver occasions a yellow precipitate of phosphate of silver. Arsenious acid is the only acid similarly acted on; and it may be determined from phosphoric acid by the action of sulphureted hydrogen, which causes a yellow precipitate with the arsenious acid, while it has no effect at all upon the phosphoric. When concentrated till the temperature attains 300°, Diluted Phosphoric Acid acquires its greatest state of concentration, and presents the appearance of a brown oily liquid, which consists of one equivalent of acid, and three of water. Although evaporated so as to become dense, it does not act upon animal and vegetable matter like sulphuric acid. The acid may be obtained in crystals, by evaporating the brown oily liquid, mentioned above, in vacuo. From its saturating power, diluted phosphoric acid is shown to contain 10.5 per cent. of real phosphoric acid. If the brown oily liquid be deprived of its water by a long continued heat of 415°, one equivalent of its water is disengaged, and the acid acquires new properties, and a yellow precipitate will no longer be occasioned by nitrate of silver.

If phosphoric acid contain *sulphuric acid*, chloride of barium causes a white precipitate; if *hydrochloric acid* be present, nitrate of silver occasions a white curdy precipitate; if *nitric acid* be present, it will decolorize a solution of sulphate of indigo, and when supersaturated with lime, nitrate of lime will be found. If *phosphorous acid* be present, a small portion of red oxide of mercury will be transformed into white, and finally into gray. *Arsenic* may be detected by Marsh's test.

Properties and Uses.—This acid produces the usual effects of the dilute mineral acids, but is milder and more assimilable. It has been used to check abnormal osseous secretions, to remove phosphatic urine, to relieve spasmodic affections, and also in the nervous debility of persons advanced in years, diabetes, impotency, and fluor albus. Externally, it has been applied to indolent ulcers. From ten to thirty drops may be given for a dose, mixed with an ounce or two of water, and this may be repeated two or three times a day.

Off. Prep.—Ammoniæ Phosphas; Ferri Phosphas; Sodæ Phosphas.

ACIDUM SULPHURICUM AROMATICUM.

Aromatic Sulphuric Acid. Elixir of Vitriol.

Preparation.—Take of Alcohol *two pints;* Sulphuric Acid *six ounces;* drop the acid gradually into the alcohol. Digest the mixture with a very gentle heat, in a closed vessel, for three days, and then add Cinnamon bark, bruised, *one ounce and a half;* Ginger root, bruised, *one ounce.* Digest again in a close vessel, for six days, and then filter through paper. —*Ed.*

History.—This tincture is of a dark reddish color, and owes its virtues chiefly to the sulphuric acid it contains, which by the admixture is rendered more pleasant to the taste. It has an agreeable odor imparted to it by the aromatics, and a very sour taste rendered palatable by dilution with water. The U. S. Pharm. prescribes *three fluidounces and a half* of the acid, instead of the six by weight.

Properties and Uses.—It possesses the same properties as sulphuric acid, for which it is generally substituted for internal exhibition. It may be given in doses of ten to thirty drops or more, diluted with about four fluidounces of water, and repeated three or four times a day. The same means must be used to protect the teeth from the action of the acid, as named under hydrochloric and nitric acids.

ACIDUM SULPHURICUM.

Sulphuric Acid. Oil of Vitriol.

Preparation.—"This acid can not be formed by the direct union of its elements, but is produced by causing Sulphurous Acid to unite with an additional equivalent of Oxygen, in contact with the elements of Water. Sulphur is burned with the aid of Nitrate of Potassa or Soda, thus yielding a mixture of sulphurous acid and nitrous acid gases. These gases are conducted into leaden chambers along with atmospheric air and steam, the bottom of the chambers being also covered with water. All the changes which take place are not thoroughly understood; but this much is certain, that the sulphurous acid is oxidized at the expense of the nitrous acid, reducing it to the state of deutoxide of nitrogen. The water becomes gradually charged with sulphuric acid, and the deutoxide of nitrogen, being reconverted into nitrous acid by contact with the oxygen of the air, again yields half its oxygen to a fresh portion of sulphurous acid; and thus, for an indefinite period, acts as a conveyer of oxygen from the air to the sulphurous acid. In this way, a comparatively small quantity of nitrate (one part) is required for a large quantity of sulphur (eight parts). When the liquid has become very acid, it is boiled down in platinum or glass vessels, until it acquires the sp. gr. 1.845, when it begins to be converted into vapor itself, all the superfluous water being now driven off."—*Gregory.* Other methods are pursued, but the principle is about the same in all.

Chemical History.—Sulphuric Acid is a heavy, transparent, odorless fluid of an oily consistence, an overwhelming acrid, acid taste, and dissolving and charring all organic substances. It freezes at —29° F., and boils at 617° F. It has a powerful affinity for water, and when mixed with it a great amount of heat is developed, depending partly on the energetic chemical action, and partly on the condensation which takes place; on this account when exposed to the atmosphere its absorption of moisture rapidly reduces its strength. It unites with water in all proportions, and the heat evolved is so great as to crack glass vessels, which may be avoided by adding the acid gradually. The presence of Sulphuric Acid, in the smallest quantity, whether free or combined, is detected in solutions by the characteristic property of forming, with any soluble compound of barium (as the chloride or nitrate), a precipitate of sulphate of baryta, which is not only insoluble in water, but also in the strongest acids, and which is decomposed and converted into sulphuret of barium when ignited with charcoal. Free Sulphuric Acid added to sugar, and then heated by steam to dryness, produces a black or brown color. When mixed with iodic acid and starch, it produces the blue iodide of starch. Sulphuric Acid reddens salicin, piperin, veratria, phloridzine, oil of bitter almonds, etc. Its formula is HO, SO_3, and its equivalent 49.

In Saxony, Sulphuric Acid is prepared by distilling partially dried green vitriol; it often fumes on exposure to the air, and is called *Fuming Sulphuric Acid*, or *Nordhausen Oil of Vitriol:* it is a compound of one equivalent, each, of anhydrous acid, and common or hydrated sulphuric acid, $HO, 2 SO^3$. When it is distilled at about 290° F., anhydrous acid passes over, and hydrated acid remains behind. *Anhydrous Sulphuric Acid*, is a white crystalline solid, which gives off thick fumes in a moist air, is converted into vapor at about 160° F., and has so strong an affinity for the elements of water, that when thrown into water it hisses as a red hot iron would do, combining with the water to form oil of vitriol. Its sp. gr. is 1.97; it melts at 66°, and boils at from 104° to 122° F., does not redden litmus unless moisture be present, and has the formula SO_3, and the equivalent 40.

According to Graham, there are three hydrates of Sulphuric Acid, besides the fuming acid, viz: the *Monohydrate*, sp. gr. 1.845; the *Binhydrate* or *ëisol*, $2 HO, SO_3$, of sp. gr. 1.78, and which, in cold weather, freezes, producing large, hard, transparent, regular crystals, having the sp. gr. 1.924; and the *Terhydrate of sulphuric acid* $3 HO, SO_3$, of sp. gr. 1.632.

The impurities met with in Sulphuric Acid, and the methods of detecting them are as follows; *organic matter*, which colors the acid brownish or black; *Arsenic*, which may be detected by Marsh's test. *Selenium*, which when the acid is diluted with alcohol, falls down in red powder; *lead* will occasion a black precipitate or brown discoloration when sulphureted hydrogen is passed through the diluted acid,—the precipitate is more certain if the acid be previously almost neutralized by ammonia. If *tin* be present, hydrosulphate of ammonia will dissolve the sulphuret of this metal which was precipitated with the lead, leaving the lead behind; by evaporation of the filtered solution the hydro-sulphate of ammonia is removed, and by heating to redness in the air, the sulphuret of tin is converted into sulphurous acid that is given off, and non-volatile oxide of tin. If the Sulphuric Acid be diluted and almost neutralized with ammonia, and ferrocyanuret of potassium be added, a blue precipitate will ensue, if *iron* be present; if the ammonia be added in excess, a brown flocculent precipitate of hydrated oxide of iron will take place. If *alumina* be present, excess of ammonia will cause an almost colorless precipitate, which, shaken with solution of potassa is dissolved (the oxide of iron being insoluble); if the alkaline solution be filtered, a solution of sal-ammoniac added to it will, after a short time, render it turbid by precipitation of the alumina. When *lime* is present, oxalate of ammonia added to the acid after it has been treated with excess of ammonia, will cause a white precipitate. If a crystal of sulphate of iron be placed in Sulphuric Acid, and, after a short time, becomes surrounded by a brown layer, a compound of *Sulphuric Acid* and *nitric oxide* is present.

Properties and Uses.—Sulphuric Acid is not used in medicine except it be much diluted; the officinal dilute acid is made by adding sufficient distilled water to give the sp. gr. 1.09, or one part of acid to thirteen of water. Diluted Sulphuric Acid is an excellent tonic, exciting appetite, promoting digestion, quenching thirst, and checking fermentation in the stomach, and is therefore used with success in morbid acidity, debility, and relaxation of the stomach. As an astringent, it is used in hemorrhages of a passive character, diarrhea, dysentery, Asiatic cholera, etc. As a refrigerant, it is very useful in checking the perspiration in hectic fever; and forms a pleasant acid drink, when sufficiently diluted with water, in continued fevers, and during recovery from exhausting diseases; as an antiseptic, it is beneficial in putrid febrile diseases. As a diuretic, it may be used in dropsies, and some forms of fever, but its use should not be continued too long, as it is apt to cause griping and looseness. It has likewise been advantageously exhibited in some cutaneous diseases, phosphatic calculous affections, dyspepsia, etc. The dose is the same as the aromatic sulphuric acid, on page 52, and may be taken in the same manner. Added to gargles, it will be found of service in ulceration of the throat and mouth, profuse salivation, etc.; and may be used in the form of a wash in indolent ulcers and several diseases of the skin.

Off. Prep.—Acidum Sulphuricum Aromaticum; Acidum Sulphuricum Dilutum; Ferri Sulphas; Linimentum Nigrum; Morphiæ Sulphas; Quiniæ Sulphas; Unguentum Acidi Sulphurici; Zinci Sulphas.

ACIDUM TANNICUM.

Tannic Acid. Tannin.

Preparation.—Cause Sulphuric Ether to percolate through any quantity of powdered Galls, in a glass adapter, having the lower end loosely closed with carded cotton. The liquor obtained in the receiver separates into two parts, and the ether must be allowed to percolate through the galls until the lower stratum of liquid in the receiver no longer increases. Pour off the upper layer, and evaporate the lower portion with a moderate heat, to dryness.

M. Sandrock states that a much larger quantity of Tannic Acid may be obtained by employing a mixture of sixteen parts of Ether and one part of Alcohol. The percolated liquid separates into two layers. The lower one contains the Tannic Acid, which may be obtained perfectly pure on evaporation; the upper layer contains the gallic acid, coloring matter, and some Tannic Acid. The Tannic Acid in the upper layer may be had by evaporating the liquid to dryness, treating the residue with pure Ether, until the lower of the two layers into which the liquid separates, no longer presents a green color; and then separating it, adding if necessary a little Alcohol, and evaporating.

Chemical Properties.—Tannic Acid is of a nearly white or pale-yellow color, having a spongy, shining appearance, it is not crystalline, unalterable in the air when solid, and having the formula $C_{18} H_5 O_9 + 3 HO$, and equivalent 212. It possesses no odor, has a most astringent taste devoid of bitterness, readily dissolves in water and in diluted alcohol, but is hardly soluble in either. The watery solution exposed to the air, absorbs oxygen, and is transformed into carbonic acid gas, which escapes, leaving behind gallic and ellagic acids. Oils do not dissolve it. Tannic Acid combines with a solution of animal gelatin, forming a white, curdy, insoluble substance, the tannate of gelatin; a piece of prepared skin introduced into a solution of Tannic Acid, absorbs the acid, and is converted into leather. With the sesquisalts of iron, Tannic Acid and its salts strikes a deep blue, nearly black color, which is a tannate of iron, and the principal ingredient of ordinary ink. Ink stains are tanno-gallates of iron, and are readily removable by oxalic and citric acids, or chloride of lime, which decomposes them and the solubility of the iron basis. Added to solutions of most of the vegetable bases Tannic Acid causes a precipitate. With solutions of the vegetable alkalies it produces precipitates which are slightly soluble in water but readily so in acetic acid; and has hence been used to test their presence even in very minute quantities. When potassa is added in excess to a solution of Tannic Acid, the tannoxylic or rubitannic acid is formed; if the mixture be boiled instead of exposed to the air, tannomelanic or tannohumic acid is formed, a bibasic, dark, humus-like powder, whose formula is $C_{14} H_5 O_7 + 2 HO$. Tannic Acid precipitates most metallic oxides from the solution of their salts; is more or less completely precipitated from its solution by mineral acids, and gives, with those acids, compounds soluble in pure water. If Tannic Acid be treated with oxidizing bodies, as with nitric acid, chromic acid, chlorine, bromine, or the superoxides, it is completely destroyed, under production of formic and oxalic acid. Acetate of lead added to a solution of Tannic Acid produces a white precipitate; tartar emetic gives a white precipitate of a gelatinous character. Tannic Acid may be obtained from catechu, coffee, fustic, quercitron, gall-nuts, kino, cinchona, tea, etc., and in each instance, will be found to possess nearly the same properties. When given internally, Tannic Acid will be found when passed in the urine to have changed into gallic acid. There is a substance formed in white wines called glaïadine, which renders them turbid and disposed to mucous fermentation, a solution of Tannic Acid will arrest this by coagulating the above-named substance.

Properties and Uses.—A pure astringent. Used in chronic dysentery and diarrhea, and in uterine and other passive hemorrhages, and as a wash or injection to remove chronic mucous discharges, as in bronchial catarrh, gonorrhea, gleet, leucorrhea, etc. It has likewise been recommended in diabetes, combined with opium, and to arrest excessive perspiration—also in conjunction with morphia in Asiatic cholera. Externally, it has been successfully used in excoriation, prolapsus ani, piles, fissure of the anus or rectum, sore nipples, phagedenic ulcers, aphthous ulceration of the mouth, sore-throat, severe salivation, and in toothaches, in solution with ether. It may be employed in form of a wash, by adding five grains to a fluidounce of water; or in ointment, one part of the acid to fifteen of lard. It is a valuable remedy, the only disadvantage being its tendency to produce constipation, which may be avoided by the addition of a small quantity of podophyllin, in cases where this resin is not contra-indicated.

Tannic acid should not be given during the presence of active inflammation. Several cases of cholera in the collapsed stage, have been cured by our physicians, by doses of ten or fifteen grains of Tannic Acid, repeated every ten or fifteen minutes, until the discharges ceased; and continuing it afterward at longer intervals, with other appropriate treatment. The Geraniin is now usually preferred by American practitioners to the Tannic Acid, as it does not leave the tissues upon which it acts so harsh and dry, as is the case with the latter agent. Dose of Tannic Acid, from half a grain to five grains.

Dr. Chausarel has proved that Tannic Acid is the best antidote against poisonous fungi, or mushrooms, etc. Thirty or forty grains of Tannic Acid dissolved in a pint and a half of water, may be taken in small glassful doses every five minutes; if too much time has not elapsed an emetic may be first administered.

Off. Prep.—Ferri Tannas. Quiniæ Tannas.

ACIDUM TARTARICUM.

Tartaric Acid.

Preparation.—Tartaric Acid is a constituent of grape juice, existing as a tartrate of potassa, and is also contained in many other plants, as in the juice of the pine-apple, tamarind, sorrel, mulberry, etc. It is prepared somewhat similar to citric acid, by forming tartrate of lime, and decomposing it by Sulphuric Acid; this is generally effected by adding an excess of Carbonate of Lime to a solution of Bitartrate of Potassa, which yields a precipitate of insoluble tartrate of lime. This is acted upon by sulphuric acid, which sets the Tartaric Acid free, and forms a precipitate of sulphate of lime. To obtain the acid pure, it is evaporated, crystallized, re-dissolved in water, strained, and evaporated three or four times. For an improvement in the manufacture of tartaric acid, see *Am. Jour. Phar.*, XXVI., 324.

Chemical Properties.—Tartaric Acid crystallizes in colorless, transparent, large oblique rhombic prisms, and having the formula $C_4 H_2 O_5 + HO$. Its combining number is 66.48 when dry, and, when crystallized, 75.48. It is permanent in the air, has a strong, pleasant, sour taste, is inodorous, dissolves in alcohol, and in $\frac{7}{13}$ parts of cold water, but more freely in boiling water, and having the specific gravity 1.75. Its aqueous solution molds on exposure, yielding acetic and butyracetic acids. A high temperature decomposes it, giving rise to several new products, as acetic acid, hydrocarbon, empyreumatic oils, etc. Fused with hydrate of potassa, it decomposes into acetic and oxalic acids and water. Tartaric Acid possesses in a remarkable degree the property of turning to the right polarization's plane of light, which is increased by warming the substance, as well as by combination with bases. Nitric acid immediately decomposes it into oxalic and carbonic acids; chlorine does not decompose it. It has a great tendency to form acid salts and double salts; with potassa and ammonia it forms neutral salts easily soluble, and acid salts not easily soluble. Tartaric Acid may be known by its sour solution, which gives white precipitates with solutions of caustic lime, baryta, strontia, and acetate of lead, the precipitated tartrates being soluble in excess of acid. Sal ammonia dissolves the precipitate produced by lime water. Sulphate of lime gives no precipitate; a solution of chloride of platinum causes a black precipitate of metallic platinum.

The presence of *sulphuric acid* may be detected in the aqueous solution of Tartaric Acid, by its white, insoluble precipitate with chloride of barium; *lime* by oxalate of ammonia occasioning a white precipitate. Either of the above impurities renders the acid more or less deliquescent. *Bitartrate of potassa* may be known by not dissolving so readily in water, and by being converted into carbonate of potassa, when incinerated. *Bisulphate of soda* or of *potassa* may be detected by undergoing scarcely any change when heated on platinum foil, whereas tartaric acid will be almost dissipated by the heat, leaving a carbonaceous residue. *Nitric acid* will cause the solution to decolorize a weak solution of sulphate of indigo; *oxalic acid* will yield a white precipitate with lime water. Tartaric Acid is *incompatible* with nearly all acids, lime, baryta, strontia, magnesia, muriate of ammonia, sulphates of potassa, soda, and magnesia, and acetate of lead, etc.

Properties and Uses.—Tartaric Acid is refrigerant, antiseptic, and antiscorbutic. It is used as a drink in febrile and inflammatory diseases, forming a cooling, refreshing, and agreeable acidulous draught. It is less costly than citric acid, and may be used instead of this acid to form lemonade. Tartaric acid enters into the composition of *Seidlitz*, as well as *Soda powders.* A colorless solution of sulphate of quinia has long been employed by physicians; it may be made by adding equal parts of Tartaric Acid and sulphate of quinia to as much water as may be desired.

Off Prep.—Ferri et Morphiæ Tartras; Ferri et Quiniæ Tartras; Quiniæ et Morphiæ Tartras; Quiniæ et Saliciniæ Tartras; Potassæ Bitartras; Potassæ Tartras.

ACONITUM NAPELLUS.

Monkshood.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Trigynia.

LEAVES AND ROOT.

Description.—This plant is known also by the name of *Wolfsbane;* the *root* is spindle-shaped or napiform, from three to six lines in diameter, about four inches long, tawny on the outside, whitish internally, giving off numerous fibers. The *stems* are simple, straight, erect, round, and about five feet high, with the inflorescence at its termination; the *leaves* are alternate, completely divided to the base into five wedge-shaped lobes, which are trifid; their segments being also slashed, linear and acute, usually callous at the re-entering angles, dark green above, lighter underneath, and petioled. The *flowers* are large, deep bluish purple, sometimes white, hairy, in a terminal raceme, on short pedicels; the *racemes* simple and cylindrical. The *petals* are five, the upper ones helmet-shaped, convex, and gradually tapering to a point, the lateral ones hairy inside, *stamens* filiform; *anthers* whitish. *Ovaries* three to five, smooth; *stigmas* simple and reflected. The *capsules* correspond in number with the ovaries; *seeds* numerous, angular, and corrugated.—*L.*—*De Candolle.*

History.—This perennial herb is a native of most parts of Europe, growing in wooded hills and plains, and is much cultivated in gardens; it flowers in May and June. The root, which consists of numerous slender radicles, is the most powerful part of the plant, but all parts of it contain powerfully poisonous properties. There are several varieties, but the *A. Napellus* and *A. Paniculatum* are the only officinal ones. The dried leaves and root retain their acridity and narcotic virtues; and the expressed juice possesses the properties of the plant. Its medicinal virtues are best extracted by alcohol, and the alcoholic extract is the most convenient and energetic preparation. It contains an alkaloidal principle, termed Aconita, or Aconitina, a black oily matter, albumen, muriate and sulphate of lime, starch, etc. The smell of the plant is feeble but nauseous, and its taste acrid and bitter, leaving in the mouth a sensation of heat and pungency, and a degree of numbness.

Properties and Uses.—Aconite is an energetic acro-narcotic poison in improper doses, occasioning symptoms of gastric irritation, with great depression of nervous energy and brain. The usual effects of an improper dose of either the tincture or powder, is a pricking or slight thrilling in the mouth and limbs, accompanied with a benumbing sensation, but without coma or convulsions. Several of the following symptoms will soon manifest themselves,—vomiting, perhaps great thirst, sometimes violent purging with painful spasms of the stomach and bowels, sense of great exhaustion, pale face, impaired vision, scarcely perceptible pulse, coldness of feet and legs, and coma or delirium; and, from paralysis of the respiratory muscles, death follows. These symptoms may vary in different cases, though several of them will always be present. Gastritis and enteritis, with pulmonary and cerebral congestion, are exhibited upon a post-mortem examination. There is no antidote known for poisoning with Monkshood, yet a timely and thorough evacuation of the stomach, with the internal and external use of stimulants, have restored persons in imminent danger to perfect health. In maximum medicinal doses, it causes gastric heat which extends throughout the general system, and occasionally the pricking sensations will be experienced, with, perhaps, benumbing feelings; or, these may pass over the whole system, with dizziness, more or less pain in the head, acute pains, excessive depression of the vital forces with feeble circulation and respiration. Aconitum should never be given in sufficient quantity to produce these effects. A drop of a solution of Aconitum in the eye occasions the pupil to contract.

Aconite should not be administered in chlorotic and paralytic affections; though it may be given in the former disease associated with iron or manganese. As a sedative and anodyne, it is useful in all febrile and inflammatory diseases, and, indeed, in all affections in which there is an increase of nervous, vascular, or muscular action. In scarlatina, inflammatory fever, acute rheumatism, pneumonia, peritonitis, gastritis, and many other acute disorders, it has been used with the most decided advantage. Its action is more especially displayed in the higher grades of fever and inflammation. The best preparation is the alcoholic extract, formed by evaporating a tincture made of a pound of Aconite and a quart of Alcohol. The dose is one-eighth of a grain. One part of the extract, with two of lard, forms an excellent ointment for painful affections. The powdered root or leaves may be given in one or two grain doses, gradually increased. The tincture made by macerating one ounce of the powdered root with six ounces of alcohol, for two or three weeks, may be given in doses of two or three drops in a teaspoonful of water, repeating every hour or two, as may be required. Its continued use sometimes produces vomiting and diarrhea.

Off. Prep.—Extract. Aconiti Alcoholicum; Tinctura Aconiti; Tinctura Aconiti Fol.; Emplastrum Extracti Aconiti Radicis.

ACONITINA.

Aconitina.

Preparation.—"Take of Aconite root, dried and bruised, *two pounds;* Rectified Spirit, *three gallons;* Diluted Sulphuric Acid, solution of Ammonia (Water of Ammonia, *U. S.*), purified Animal Charcoal, each a *sufficient quantity.* Boil the aconite with a gallon of the spirit, for an hour, in a retort with a receiver fitted to it. Pour off the liquor, and again boil the residue with another gallon of the spirit and with the spirit recently distilled, and pour off the liquor also. Let the same be done a third time. Then press the aconite, and having mixed all the liquors and filtered them, distil the spirit. Evaporate the remainder to the proper consistence of an extract. Dissolve this in water and filter. Evaporate the solution with a gentle heat, so that it may thicken like syrup. To this add of Diluted Sulphuric Acid, mixed with Distilled Water, sufficient to dissolve the Aconitina. Next drop in solution of Ammonia, and dissolve the precipitated Aconitina in Diluted Sulphuric Acid, mixed, as before, with Water. Then mix in the Animal Charcoal, occasionally shaking for a quarter of an hour. Lastly, filter, and having again dropped in solution of Ammonia, so as to precipitate the Aconitina, wash and dry it."—*Lond.*

Chemical Properties.—Aconitina forms a shining, transparent substance, or is precipitated in white grains, having the formula $NC_{60}H_{47}O_{14}$. It is free from odor, but has a disagreeably bitter, sharp taste, is not volatile, easily fusible, but may be completely dissipated when exposed to a high temperature on platinum, is easily soluble in alcohol, ether, or the acids, requires one hundred parts of water at 60° and fifty of water at 212° F. to dissolve it, is precipitated from its acid solution by ammonia, has a strong alkaline reaction, and completely saturates acids. Its salts do not crystallize, but appear as a gum-like mass, having a sharp and bitter taste. Ammoniacal products are produced when Aconitina undergoes dry distillation. It is *incompatible* with tinctures of iodine, and galls. Mr. A. Marson's Aconitina is the most active preparation made. *See Hyoscyamia.*

Properties and Uses.—Aconitina is too powerful a poison to be used internally, one-fiftieth of a grain of Morson's preparation having endangered life. Dr. Turnbull has used it externally in neuralgia and rheumatism, in the form of tincture or ointment. His ointment is composed of Aconitina sixteen grains, Olive Oil half a drachm, Lard an ounce; mix. To be rubbed for several minutes over the affected part. The tincture is made by dissolving eight grains of Aconitina in two fluidounces of Alcohol. In using these preparations they should not be applied where the skin is broken or excoriated. They usually produce the numb and tingling sensations common to the root.

ACORUS CALAMUS.

Calamus. Sweet Flag.

Nat. Ord.—Araceæ. Acoraceæ. *Sex. Syst.*—Hexandria Monogynia.

THE RHIZOMA.

Description.—Calamus has a fleshy, thick, creeping, rather spongy *rhizome*, with many long fibers; the rhizome is somewhat flat, jointed at intervals of from six to twelve lines, and is of a pale greenish-white color externally. The *leaves* are radical, long, ensiform, erect, bright green, near an inch in width, somewhat reddish below, and sheathing at their lower extremities; *stalk* like the leaves, thicker below the spadix, and not quite so tall; the *spadix* is about three inches long, sessile, cylindrical, tapering, emerges laterally from the scape near its center, and is covered with numerous, thick-set, small, pale-green flowers, which have no scent except when bruised. The flowers are surrounded with six petaloid scales. The *stamens* are six; *filaments* linear; *anthers* one-celled, reniform; *ovaries* sessile, three-celled, with six pendulous ovules in each cell; *stigmas* minute, pointed, three-lobed; *capsules* dry, few seeded.—*L.*—*Bar.*

History.—This perennial herb grows in nearly all parts of the world, in damp or watery places, as swamps, meadows, etc., and flowers from April to July. The rhizome is the part employed; it should be gathered in the months of October and November, cleansed of its fibers and dirt, and dried quickly in a room gently warmed. The dried roots of commerce are in compressed pieces, from three to six inches long, of a light brown or fawn color externally, whitish or of a slight roseate hue internally, corrugated outside, and of a spongy or corky texture internally. It has an agreeable, aromatic odor, and a peculiar, warm, bitterish taste. Water or alcohol takes up its medicinal virtues. Trommsdorff found it to contain essential oil, resin, extractive with chloride of potassium, gum with phosphate of potassa, starchy matter, woody fiber and water. The first three are its active constituents. The oil is lighter than water, and is pale-yellow, very odorous and pungent.

Properties and Uses.—The root is carminative, slightly tonic and excitant, and forms a useful adjunct to other tonics and stimulants. It may be used in cases of flatulent colic, dyspepsia, feebleness of the digestive organs, and to aid the action of bark or quinia in intermittents. It forms an excellent substitute in syrup for Godfrey's Cordial. Externally, it is a valuable application to indolent ulcers, and to keep up the discharge from blistered surfaces and issues. Dose of the infusion, made by scalding four drachms of the root, coarsely bruised, in eight fluidounces of water, from four to six fluidounces; of the powdered root, one or two scruples. In flatulent colic of infants, it is best combined with magnesia.

Off. Prep.—Decoct. Acorus; Infus. Acorus.

ACTÆA.

ACTÆA ALBA.—White Cohosh.

ACTÆA RUBRA.—Red Cohosh.

ACTÆA SPICATA.—Baneberry. Herb Christopher.

Nat. Ord.—Actæa. *Sex. Syst.*—Polyandria Monogynia.

THE RHIZOMA.

Description.—Actæa Alba, sometimes called *White Baneberry*, is about two feet high, with large, decompound *leaves; raceme* oblong, with pedicels as large as the general peduncle; *petals* truncate at the apex, and equaling the stamens, *berries* milk-white; *flowers* white and appearing late in May.—*G.*—*W.*

Actæa Rubra or *Red Baneberry*, is about two feet high, with large decompound *leaves; raceme* ovoid or hemispherical, petals acutish and shorter than the stamens; *pedicels of the hemispheric raceme*, slender and less than the full grown peduncles; *berries* oval, ripe in summer, cherry red, and forming a raceme three or four inches long; *flowers* white, and appearing in April and May. The above two plants are natives of this country, they are perennial herbs, inhabiting the rich soil of forests, from Maine to Carolina.

Actæa Spicata inhabits the elevated parts of Europe, Caucasus, and Siberia, reaching the height of three or four feet. The *stem* is erect, leafless, triangular, not much branched, and scaly at the base; the *root* is perennial, creeping; the *leaves* are biternate or triternate, petiolated with ovate-lanceolate, serrated or slashed leaflets; *flowers* white; *spike* terminal, ovoid; *pedicels* as long as the flowers, downy; *sepals* four, transient; *stamens* numerous the exterior spathulate, obtuse, and sterile. *Berries* roundish, juicy, black.—*L.*

History.—Actæa Spicata has a blackish-brown root, which, when fresh, has a sickening odor, and a disagreeable amarous and acrimonious taste. The berries are poisonous, causing mental hallucination, gastric irritation and even death. The properties of the root are imparted to water by infusion, and to alcohol.

Properties and Uses.—The recent root of Actæa Spicata is a violent purgative, resembling that of the black hellebore in its action; when dried it is not so active. It is rarely used internally. A decoction used locally destroys parasitic insects as lice, and the itch insect.

The *A. Alba* and *A. Rubra*, possess similar qualities; they are said to possess purgative and emmenagogue properties, and are viewed as substitutes for the Cimicifuga Racemosa, and Caulophyllum Thalictroides; but this is undoubtedly an error.

ADEPS.

(Axungia, Ed. Adeps Suillus Preparatus, Dub.)

LARD. THE PREPARED FAT OF THE SUS SCROFA OR COMMON HOG, FREE FROM SALT.

History.—Lard used for medicinal purposes should not contain salt; when good, it is white, somewhat translucent, of granular appearance, smooth to the touch, somewhat of the consistency of butter, a faintly sweetish taste, and no odor; but by exposure to the air, it absorbs oxygen, acquires an unpleasant odor and rancid properties, and is said to be *rancid.* Water does not dissolve it, and alcohol but slightly; ether is a solvent of it, as well as the essential oils. The concentrated acids decompose it, and caustic alkaline solutions form soap with it, when boiled together. It melts at about 80° to 90° F., and then combines with resins, wax, and fixed oils, forming ointments, liniments, etc., as may be required. When heated in close vessels, it undergoes a species of destructive distillation, by which margaric, oleic, acetic, and probably, benzoic acids are formed, together with other less important modifications of its constituent fatty principles. It consists of three neutral fatty principles, called Olein, Stearin and Margarin, which are found in most animal oils and fats, whose hardness or softness is owing to the quantity which they contain of each of these principles.

Olein, or the *Oleinate of Glycyl*, is the liquid principle of oils, and is unknown in the native state. It is an oily fluid, devoid of color, taste and odor, is partially dissolved by alcohol but not by water, readily so by ether, and becomes solid at 20° F. It is convertible by saponification into glycerin, margaric acid and oleic acid, and according to Saussure, is composed of carbon 76+, hydrogen 11+, oxygen 12+ and nitrogen 0.353. It is also called *Elaine.*

Stearin or *Stearinate of Glycyl*, is a crystalline solid somewhat resembling cetaceum, is sufficiently friable to admit of pulverization, freely dissolved by ether at 96° F., but is completely separated again on cooling, is also dissolved by alcohol, but not by water, melts at 144° F., and is convertible by saponification into stearic acid and glycerin. It may be obtained from Lard or Mutton Tallow, by washing either of these with ether until they suffer no more loss; the stearin remains behind, and may be collected in flakes by boiling it in alcohol and then allowing it to cool. It consists of carbon, hydrogen, and oxygen.

Margarin, or the *Margarinate of Glycyl*, may be procured by evaporating the ethereal solution obtained in the preparation of stearin, and pressing the product between folds of bibulous paper, to free it from any adhering olein. In most of its properties margarin is identical with stearin. It varies in being soluble in ten parts of cold ether, and in melting at 119° F. It is composed of margaric acid and glycerin.

Lard speedily becomes unfit for medicinal use by the action of the atmospheric oxygen, on which account it should be kept carefully secluded from this action. When pure, it contains 62 p. ct. of olein and 38 of stearin and margarin together.

Properties and Uses.—Lard is emollient, and is a convenient article for the formation of ointments, plasters, and liniments. It is also used, without addition, to discuss tumors, by friction, or with cataplasms.—*Ed.* Sometimes it is added to purgative injections. When applied to blistered or excoriated parts, it will be apt to cause ulceration, unless it be free from rancidity.

ADIANTUM PEDATUM.

Maidenhair.

Nat. Ord.—Filices, or Polypodiaceæ. *Sex. Syst.*—Cryptogamia Monogynia.

THE HERB.

Description.—Adiantum Pedatum is a delicate and most graceful fern, growing from twelve to fifteen inches high, with the *stipe* or *stalk* and *rachis*, slender, polished, and black or dark purplish, very glabrous; the *frond* or *leaf* pedate, with pinnate branches; the *pinnæ* halved, triangular-oblong, entire on the lower margin from which the veins all proceed, and incised at the upper and fruit-bearing margin; the *barren segments* are toothed, the *fertile ones* entire. *Sori* linear, oblong; arranged along the margin of the frond; *involucre* formed by turning back the margin of the frond over the sori, and it opens inward. *Petiole* smooth.—*G.*

History.—This plant is perennial, and is found in deep woods on moist, rich soil, throughout the United States. The leaves are bitterish and somewhat aromatic, and yield their properties to boiling water.

Properties and Uses.—Maidenhair is refrigerant, expectorant, tonic, and subastringent. In decoction it forms an elegant refrigerant drink in febrile diseases, and in erysipelas, and is also beneficial in coughs, chronic catarrh, hoarseness, influenza, asthma, etc. It is likewise reputed efficacious in pleurisy, and in jaundice. The decoction or syrup may be used freely. This plant is highly valued by some practitioners, and deserves investigation.

Off. Prep.—Decoctum Adiantum; Infusum Adiantum.

ÆSCULUS HIPPOCASTANUM.

Horse-chestnut.

Nat. Ord.—Hippocastanaceæ—Sapindaceæ, and Æsculaceæ. *Sex. Syst.*—Heptandria Monogynia.

BARK AND FRUIT.

Description.—The Æsculus Hippocastanum is a beautiful middle-sized, round-headed tree, fifty or sixty feet in height, with many branches, a rugose, tawny bark, and a white, not very firm wood. The *leaves* are opposite, digitate, long-stalked, and consist of seven obovate-lanceolate, acuminate, bright-green, coarsely and irregularly serrated *leaflets* which diminish in size from the center. The *flowers* are in thyrses, or pyramidal racemes, pink colored and white, terminal. *Calyx* light green, campanulate, obtusely five-toothed. The *corolla* is spreading, and is composed of five oblong, unguiculate, fringed, wavy *petals*, with a small reddish spot above the claw. *Stamens* seven; *filaments* shorter than the petals, subulate; *anthers* reddish-brown, oblong; *ovaries* roundish; *style* short; *stigma* pointed. *Fruit* a prickly, thick and tough capsule, three-valved, one to three celled, with usually two large, deep chestnut-brown *seeds*, and a large broad space forming a hilum.—*L.*

History.—Horse-chestnut is indigenous to certain parts of Asia, from whence it was conveyed into Europe. It is now common to many parts of the United States, where it grows rapidly, blossoming from April to July, and maturing its fruit in the latter autumnal months. The bark has a rough amarous taste, and is nearly odorless; analysis has found in it tannic acid, a bitter alkaloid, discovered by Canzoneri, which he called *Æsculin*, and some other principles. Water or diluted alcohol are the best solvents of the virtues of the bark; the aqueous infusion is bitter, fawn colored, and non-astringent. Gelatin precipitates its tannic acid; iron gives a green precipitate; infusion of galls and tartar-emetic produce no effect upon it.

Æsculin, $C_{16} H_9 O_{10}$ may be prepared from a strong hydro-alcoholic tincture of the bark, by distilling off the alcohol, and setting the residue in a cool place for some time. It appears as a white powder, which is formed of minute acicular crystals, having a bitterish taste, no odor, soluble in 12½ parts of water at 212° F., and in 672 parts at 50° F., partially soluble in alcohol, and insoluble in ether. It is colored red, and then yellow by hydrochloric acid. A minute quantity of Æsculin in solution produces an iridescence, which is destroyed by the hydrochloric acid.

The *Æsculus Glabra*, or *Buckeye*, common to the Western States, is said to be useful as a substitute for the *Æ. Hippocastanus;* the fruit contains an abundance of very fine starch, which it is surprising has not yet been introduced into commerce.

Properties and Uses.—Horse-chestnut Bark is tonic, astringent, febrifuge, narcotic, and antiseptic. In intermittent fever the bark has effected cures when given in doses of a teaspoonful four or six times a day. Ten grains of the powder of the rind of the nuts, have been found equivalent, in narcotic power, to three of opium. Gangrenous and ill-conditioned ulcers have been benefited by a strong infusion of the bark. The whitish, central part of the nuts, when in powder, have been recommended as a sternutatory in some cases of ophthalmia and headache.—*Coxe.*

AGARIC.

Touchwood. Spunk. Tinder.

Nat. Ord.—Fungales, or Fungaceæ. *Sex. Syst.*—Cryptogamia Fungi.

History.—This is obtained from various fungus plants, of the mushroom tribe. These plants afford a great diversity of form and structure, being in their simplest character little articulated filaments composed of chains of cellules, as in the mildew of the rosebush, and in moldiness, *mucor;* again, they may present an even and imperforate surface, and another separated into plates or cells, in which the sporules are deposited. They absorb a great amount of oxygen with evolution of hydrogen and carbonic acid gas, and contain considerable proportions of nitrogen. They are destructive to nearly all organic matter upon which they grow.

The *Boletus Laricis*, known by the names of *Larch Agaric*, *White Agaric*, *Purging Agaric*, etc., is procured from Asia, Corinthia, and Russia, where it is found growing upon the larch. It is in masses varying from the size of an ordinary apple to that of a large nutmeg-melon; its shape somewhat resembles a horse's hoof; it is reddish-gray or yellowish externally, whitish internally and of a spongy, friable consistence; it has a feeble odor, and a bitter, acrid, somewhat sweetish taste. It is collected in August and September, deprived of its outer covering, and then dried and bleached in the sun.

The *Boletus Ignarius*, or *Agaric of the Oak*, is a fungus found on oak, cherry, willow, plum, and other trees. When young it is soft but gradually becomes hard and woody. In shape it somewhat resembles the preceding; its upper smooth surface is marked with dark circular ridges, and its under is very porous and of a yellowish-white color. It is tasteless and inodorous. The *Boletus Fomentarius*, growing on similar trees with the *B. Ignarius*, when cut in slices, beaten, soaked in a solution of nitre, and dried, forms an inflammable substance known as *Spunk*, *Amadou*, or *German Tinder*. A white amorphous powder, called *laricin*, is obtained from some of these plants; it has a bitter taste, is soluble in alcohol and oil of turpentine, forms a paste with boiling water, and has the formula $C_{14}H_{12}O_4$.

Properties and Uses.—The dust of the *Larch Agaric* is irritating to mucous surfaces, causing tears when it enters the eyes, and sneezing, cough, and nausea, when the nostrils are exposed to it. It has been used in half drachm or drachm doses as a purgative; in larger doses as an emetic. In doses of from three to ten grains, gradually increasing to sixty grains in the course of the twenty-four hours, it has been found efficacious in arresting the nocturnal perspiration of consumptives. Externally, it has been used, together with the *Agaric of the Oak*, as a styptic, and said to restrain not only venous but arterial hemorrhages, without the use of ligatures; it does not appear, however, to possess any real styptic power, or to act otherwise than dry lint, sponge, or other soft application. Prepared with nitre as for tinder, it has been used as a species of moxa.—*Ed. Duncan.*

AGAVE VIRGINICA.

False Aloe.

Nat. Ord.—Amaryllidaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—This is a perennial, herbaceous, stemless or scape-bearing plant, with a premorse, tuberous *root.* The *leaves* are linear-lanceolate, fleshy, glabrous, radical, with cartilaginous serratures on the margin. The *scape* is simple, glabrous, with leaf-like scales and sessile flowers, terete, and from three to six feet in height. The *flowers* are scattered in a loose, wand-like spike, very fragrant, greenish-yellow, with the tube longer than the acute segments. The *corolla* is erect, superior, tubular or funnel-form; *filaments* erect, longer than the corolla; *anthers* introrse. *Capsule* roundish, obscurely triangular, three-furrowed, three-valved, three-celled, and many-seeded.—*G.*—*W.*

History.—This plant is common to Pennsylvania and the Southern States, growing on dry or rocky banks, and flowering in August and September. In some parts of the country, this plant is considered a valuable antidote to wounds by poisonous snakes. The root is very amarous, and yields its properties to alcohol, and water by infusion.

Properties and Uses.—False Aloe is reputed laxative and carminative, and has been beneficially employed in obstinate diarrhea, flatulency, spasm of the intestines, etc.

The AGAVE AMERICANA, *American Aloe*, also called *Century Plant*, from an erroneous supposition that it blossoms only once in a hundred years, is the largest of all herbaceous plants; it inhabits the warmer latitudes of the American continent, where it flourishes as an evergreen. A wine may be obtained from the juice of the plant, by subjecting it to fermentation. The fresh juice is said to act upon the kidneys and bowels, and also to promote menstruation. Dr. G. Perrin considers it a superior remedy in scorbutus, preferring it to lime-juice, in doses as high as two fluidounces three times a day.—*N. Y. Jour. Med. N. S. VII.*, 181.

AGRIMONIA EUPATORIA.

Agrimony.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Digynia.

THE ROOT AND LEAVES.

Description.—Agrimony has a reddish, tapering, not creeping *root*, branched at the summit. The *stems* are about two feet high, leafy, scarcely branched, and covered with soft, silky hairs. The *leaves* are alternate, nearly smooth beneath, interruptedly pinnate, and consist of three, five, or seven oblong-obovate, or oval-lanceolate *leaflets*, from one to three inches long, and about one-third as wide, sessile, coarsely serrated, almost glabrous, with various minute intermediate ones; the terminal leaflet with a short petiolule. *Stipules* of the upper leaves, large, rounded, dentate or palmate. *Flowers* very numerous, subsessile, yellow, in a dense tapering spike, with lobed bracts; they are about four lines in diameter. *Racemes* six to twelve inches long, spicate. *Petals* five, rarely twice the length of the calyx. *Calyx* inferior, five-cleft, invested with an outer lobed one; *calyx-tube* curiously fluted with ten ribs, and surmounted with reddish-hooked bristles. *Stamens* twelve; *carpels* two; *fruit* hispid.—*L.*—*G.*—*W.*

History.—This perennial herb is common to Canada and the United States, as well as Europe and Asia. It is found along roadsides, and in fields and woods, bearing racemes of yellow flowers in July and August, and is sometimes called *Cockleburr*, *Stickwort*, etc. It has a fragrancy which is more perceptible in the flowers, and a harsh, aromatic, astringent taste, which is strongest in the root. It yields its properties to water, or alcohol. Its volatile oil may be obtained by distillation.

Properties and Uses.—Agrimony is a mild tonic, alterative and astringent. A decoction of it is highly recommended in bowel complaints, gonorrhea, leucorrhea, chronic mucous diseases, chronic affections of the digestive organs, profuse bleedings of an asthenic character, certain cutaneous diseases, icterus, etc. A strong decoction, sweetened with honey, is reputed an invariable cure for scrofula, if its use be persisted in for a length of time; and it has also been highly extolled in the treatment of gravel, asthma, coughs, and obstructed menstruation. Dr. D. C. Payne speaks highly of a continued use of a decoction of this plant in the treatment of erysipelas, and scrofulous affections, to be used freely in connection with diet and regularity of the bowels. As a gargle, the decoction is useful in ulcerations of the mouth and throat. A drachm or two of the pulverized leaves may be taken for a dose, or two or three fluidounces of the decoction. The astringency of the root renders it very useful in those affections requiring the exhibition of astringents.

Off. Prep.—Decoct. Agrimoniæ; Infus. Agrimoniæ.

AJUGA CHAMÆPITYS.

Ground Pine.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE LEAVES.

Description.—Ground Pine has an annual diffused *stem*, with three cleft *leaves;* and the *flowers* solitary and axillary, shorter than the leaves.

Corolla with the upper lip minute and two-toothed. *Stamens* longer than the upper lip; *anthers* all reniform, one-celled.

History.—This herb inhabits Europe and several sections of the United States, where it is also known by the names *Bugle* or *Germander.* The parts used are the leaves and tops, which have a slightly terebinthine, not unpleasant smell, and a rough taste, which properties are imparted to diluted alcohol. An essential oil, somewhat terebinthinate, is furnished by distillation.

Properties and Uses.—The leaves of this plant are somewhat excitant, and exert an influence on the urinary organs; they have proved efficacious in menstrual derangements, and arthritic affections; and are said to be of service in dropsy, jaundice, strangury, and all visceral obstructions. From thirty to sixty grains of the pulverized leaves may be administered every two or three hours; but their vinous tincture is preferred in doses of from half a fluidrachm to a fluidrachm.

ALCOHOL.

ABSOLUTE ALCOHOL.—Hydrate of oxide of Ethyle. Specific gravity, 0.794–6.

SPIRITUS RECTIFICATUS.—Rectified spirit. Specific gravity, 0.835.

ALCOHOL DILUTUM.—Proof-Spirit. Diluted Alcohol. Specific gravity, 0.935.

Preparation.—The pure spirit obtained by the distillation of fluids that have undergone vinous fermentation is called Alcohol, and which appears to have been prepared as early as in the twelfth century by the Arabians. Different materials are employed in different countries to undergo the vinous fermentation, as the previous step to distillation, in order to separate the Alcohol therefrom; thus, in France, Spain, etc., wine from the juice of the grape is distilled for the purpose, affording the well-known liquor, Brandy. Malt Spirit is made from barley and other grains, infused in water, and suffered to ferment, forming Beer, Porter, Ale, etc. When it is in a fit state, it is subjected to distillation and furnishes the common Gin of commerce; infusions of rye, potatoes, etc., fermented and then distilled, yield the same liquor, which is generally flavored by redistillation with turpentine. Rum is made from the refuse of the raw sugar manufactories, mixed with molasses; or, from the juice of the sugar-cane. Cider, from the juice of the apple; Perry, from the juice of the pear; Arrack, from the juice of the palm tree in Batavia, and from rice or millet in China. Koumiss, from mare's milk, by the Tartars, and a similar spirit, though weaker, has been obtained from the milk of the cow.—*Coxe.* Each of these liquids contains a greater or less proportion of Alcohol in combination with various matters, and from which it may be separated by distillation. By repeatedly distilling these various liquors, and using carbonate of potassa, or lime to prevent the water from rising during the process, the

Alcohol is deprived of its volatile oil, water, coloring matter, etc., and is obtained as rectified spirit; the process of purification is called *rectification;* and the liquid left after the Alcohol has been removed, contains, among other substances, *fusel oil*, or *grain oil*, and which may be obtained by still further distillation. Common Whisky which contains a large percentage of Alcohol, at least as great as that of any other ardent spirit, and which is much cheaper and more quickly prepared, is generally the only liquor employed in the manufacture of Alcohol.

With the exception of Alcohol and Whisky, but very little pure liquors are to be had in this country, as they are almost entirely superseded by the factitious articles manufactured by liquor dealers. The following formulæ for some of these domestic preparations are from an old dealer and manufacturer. *Domestic Gin* is made of Neutral Spirits forty gallons, good Holland gin four gallons, Oil of Juniper three ounces, Oil of Anise one ounce; mix together. *Domestic Brandy* consists of Neutral Spirits one gallon, good Brandy one pint, Molasses enough to color, Sweet Spirits of Nitre eight ounces.

Alcohol is said to be *proof*, when at 60° F., it has the specific gravity 0.920; if the specific gravity be above this, it is said to be *below* proof; if it be below, the liquor is *above proof.* The weaker Alcohol employed in pharmacy has about the specific gravity of proof-spirit. By distillation, an Alcohol of specific gravity not less than 0.825 may be procured; but when a still stronger spirit is required, it is accomplished by rectifying the Alcohol, over well burnt charcoal to free it from the fusel oil, and then allowing it to stand for a few days with coarsely broken, fused chloride of calcium, which absorbs the water and prevents it passing over in a gasiform condition during the subsequent distillation. The result is *absolute* or *anhydrous* Alcohol, or the *Oxhydrate of Ethyle*, and which has the formula of $AeO+HO$. Other chemicals which have a greater affinity for water than Alcohol has, may be employed in the production of Absolute Alcohol, as carbonate of potassa, calcined sulphate of soda, etc., but none of them are preferable to the chloride of calcium. Caustic potassa can not be safely used, as it is apt to alter the Alcohol, especially when in contact with the atmosphere. Should unslaked lime be used, it must be added in excess, as there is danger of the hydrate of lime formed parting with its water toward the latter part of the distillation, and thus weakening the Alcohol.

History.—Pure Absolute Alcohol is a colorless, mobile, very thin flowing liquid, having a faint, pleasant fruit-like odor, and a sharp, burning taste. At 60° F., its specific gravity is 0.7947; and at 68° F., it is 0.792–0.791. It boils at 172° F., and at 146° below zero assumes an oleaginous consistence; it is very combustible, burning with a pale blue flame, without smoke or residue, giving out a very intense heat, and producing carbonic acid and water.—*Coxe.* Chloride of sodium added to it will render its flame yellow; chloride of potassium, whitish-violet; boracic acid, or a salt of copper, green; chloride of lithium, carmine red; chloride of strontian, crimson; and chloride of barium, greenish-yellow. A small lump of anhydrous baryta placed in Absolute Alcohol, will not crumble into powder unless water be present. It mixes in all proportions with water, wood-spirit, and ether; heat is evolved when it is added to water. One part of ether added to two or three parts of Alcohol, forms Hoffman's Anodyne Liquor. On account of its affinity for water, it preserves animal and vegetable tissues from putrefaction. It dissolves hydrate of potassa, and of soda, most chlorides and bromides of metals, the organic acids, camphor, volatile oils, iodine, urea, gums, resins, balsams, caseine, most deliquescent salts, and the different sugar-like substances. With nearly all acids it produces the compound ethers. Most oxygen salts with inorganic acids, excepting lime and nitrate of magnesia, starch, caoutchouc, the proteine compounds, etc., are insoluble in it. Of the fixed oils, castor oil is the most freely dissolved by it. It combines with many neutral metallic chlorides, as of magnesium, calcium, manganese, etc., taking, in these compounds the place of water of crystallization. Sulphur and phosphorus are dissolved by it to a limited extent. Dry chromic acid introduced into a mixture of air and alcoholic vapor, causes an explosion. If a spiral piece of platinum wire be placed upon the wick of an alcoholic lamp, and the flame be suddenly blown out, the platinum wire will continue to glow with a white heat, caused by the imperfect combustion of the alcoholic vapors, which give rise to the formation of lampic acid, of a pungent and disagreeable smell.

The Alcohol of commerce possesses the above properties in proportion to its freedom from water, as known by its specific gravity; the rectified Alcohol of the United States has the sp. gr. 0.835, and is used in pharmacy to form tinctures, extracts, etc. *Dilute Alcohol* is composed of equal parts of Alcohol sp. gr. 0.835, and Distilled Water; its specific gravity is 0.935, and it is employed for similar purposes as the rectified spirit, in those instances where a stronger liquor is not required. One hundred parts by measure of the several liquors named below, were found by Mr. Brande to contain the following percentages of Alcohol: Brandy 55.39; Rum 53.68; Gin 51.60; Scotch Whisky 54.32; 'and Irish Whisky 53.20; the Alcohol being at 60° F., of specific gravity 0.825. The value of Alcohol, and of ardent spirits is proportioned to their various specific gravities, which are determined by alcohometers. Alcohol is represented by $C_4 H_4 + 2 HO$— equivalent 46.

Properties and Uses.—Alcohol is seldom or never used internally, except in dilution. Undiluted, it is a powerful irritant and poison, rapidly causing intoxication, and, if in large quantities, death. It is usually employed in the form of wine, brandy, gin, beer, etc., which, in moderate doses, act as diffusible stimulants, which are highly beneficial in prostrating diseases and in cases in which this kind of stimuli are indicated. In large quantities, and continued daily, these liquors occasion intoxication, nervous derangement, loss of appetite, mental imbecility, dyspepsia, indurated liver, granular disease of the kidneys, paralysis, mania, apoplexy, and death. The alcohol is absorbed, and may be detected in the blood, urine, breath, brain, liver, and other organs, producing permanent injury to them. Brandy is said to be cordial and stomachic; rum, heating and sudorific; gin and whisky, diuretic. The danger of manufacturing drunkards by the administration of wine or brandy, bitters, cordials, and the like, which was so common a few years since, we are glad to say, has now almost entirely ceased; and although alcoholic tinctures are sometimes prescribed, yet it is in such small doses, and so well diluted with water, that no fear of intemperance can arise in the mind of the physician. There are very few cases in which alcoholic stimulants are given, and those are never of a chronic character, or in which these fluids have to be used longer than a few days. The discovery of our concentrated preparations, and improved modes of treating disease, have done much to set aside this dangerous and unscientific practice.

Dr. Christison recommends "a mixture of equal parts of rectified spirit and white of egg as an application to excoriations from pressure in fever and other exhausting diseases. It is to be applied frequently with a fine brush or feather, and renewed as it dries, till an albuminous coating is formed over the part." Alcohol may be made to act as an external stimulant or refrigerant, by merely applying it to a part, and preventing its evaporation by placing a compress of linen or muslin over it to produce the first effect; or, by allowing it to evaporate to produce the latter.

Pharmaceutists make great use of Alcohol of various strengths, in the numerous officinal preparations.

ALCOHOL AMYLICUM.

Amylic Alcohol. Fusel Oil. Grain Oil.

Preparation.—"Take of the light liquid, which may be obtained at any large distillery, by continuing the distillation for some time after the pure spirit has all been drawn off, *any quantity.* Introduce it into a small still or retort connected with a condenser, and apply heat so as to cause distillation; as soon as the oil begins to come over unmixed with water, the receiver should be changed, and the distillation being resumed and carried nearly to dryness, the desired product will be obtained. The liquid drawn over during the first part of the distillation will consist of an aqueous fluid, surmounted by a stratum of the Amylic Alcohol. This latter, though impregnated with a minute quantity of water, should be separated and preserved, as being sufficiently pure for use."—*Dub.*

History.—Amylic Alcohol was first noticed by Scheele, in the spirit obtained by distilling fermented potatoes, and was called *Oil of Potato Spirit;* since his time its general character has been more fully investigated by several chemists. It is now found not only in potato-spirit, but among the products of alcoholic fermentation generally; in which it exists in the $\frac{1}{400}$th or $\frac{1}{500}$th part. When alcohol is distilled from potatoes, toward the termination of the process a whitish fluid passes over, which, when allowed to rest, yields a deposit of Amylic Alcohol, combined with nearly equal parts of water and alcohol. This is washed several times in water, then placed in contact with chloride of calcium to remove the water, and distilled over again, in order to purify it. Alcohol and water pass over at first, but as the heat becomes elevated to 270° F., a clean receiver is substituted for the one just used, into which the pure Amylic Alcohol is received as it passes over. It is viewed as a hydrated oxide of amyle, whose formula is $C_{10} H_{11} O + HO$. It is sometimes called *Corn Spirit Oil.*

Amylic Alcohol is a limpid, transparent, very mobile, oily liquid, of a light yellow color, having a very nauseous odor, producing stupefaction, and an acrid, sickening taste. Its vapor, when inhaled, causes cough and spasmodic dyspnœa, resembling asthma, often followed by vomiting. It produces an evanescent stain on paper; gives a bluish-white flame when burned with a wick or heated; boils at 268° F.; forms shining crystalline plates at 4° F.; has the specific gravity at 60° of 0.812; and absorbs hydrochloric acid gas largely, heat accompanying the process. It unites in any quantity with alcohol, ether, fixed and volatile oils, and concentrated acetic acid; is hardly dissolved by water, to which it imparts its odor, and the property of becoming beaded when shaken. Iodine, camphor, phosphorus, resins, fatty matters, sulphur, etc., are dissolved by it; and it combines with solutions of potassa or soda without alteration. Heated with dry potassa, it undergoes decomposition, evolving hydrogen, and forming valerianate of potassa by absorption of oxygen.

Properties and Uses.—Valerianic acid, and several medicinal valerianates, are prepared by the aid of Amylic Alcohol.

ALETRIS FARINOSA.

Unicorn Root.

Nat. Ord.—Liliaceæ, *Lindley.* Hæmoderaceæ, *Brown.* *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—Aletris Farinosa, also known by the several names of *Star-grass*, *Colic-root*, *Ague-root*, *Crow-corn*, etc., has a premorse, perennial root, with radical *leaves*, rosulate in a single circle, sessile, lying flat upon the ground, ribbed, broad, lanceolate, smooth, the large ones being three or four inches long, and one-fourth as wide. The *scape* or *flower stem* is from one to three feet high, erect, simple, invested with remote scales or bracts which sometimes expand into small leaves, and surrounded at the bottom by the radical leaves. *Spike* slender, scattered, each *flower* with a short pedicel and a minute bract. *Calyx* none. *Perianth* white, of an oblong bell-shape, divided at the mouth into six acute, spreading segments; the outside, especially as the flower grows old, has a wrinkled, roughish, or mealy appearance. *Stamens* six, short, inserted near the mouth of the perianth at the base of the segments; *ovary* three-lobed, pyramidal, tapering, semi-inferior; style triangular, separable into three. *Capsule* triangular, invested with the permanent corolla, three-celled, three-valved at top. *Seeds* numerous, minute, fixed to a central receptacle.—*L.*— *W.*—*G.*

History.—Unicorn Root is indigenous to North America, growing most generally in low grounds, edges of woods, sandy soils, etc. Its flowers are white, and appear from May to August. The part used is the root, which is from half an inch to one inch and a half in length, rather black on the outside, light brown inside, the surface irregular, wrinkled, and scaly looking. It is quite brittle, has a peculiar faint odor, and an exceedingly bitter taste. Alcohol is its best solvent. (*See Helonias Dioica.*)

Properties and Uses.—Unicorn Root, in the recent state and in large doses, is considerably narcotic, with emetic and cathartic properties. When dried these properties are destroyed, and it becomes a bitter tonic. It has been used in decoction or tincture, in flatulent colic, hysteria, and to increase the tone of the stomach. It is of much utility in dyspepsia, as well as in cases of general or local debility. But its most valuable property consists in the tonic influence it exerts upon the female generative organs, giving a normal energy to the uterus, and thus proving useful in cases where there is an habitual tendency to miscarriage. In chlorosis, amenorrhea, dysmenorrhea, and engorged conditions of the uterus, as well as in prolapsus of that organ, it is one of our best vegetable agents. The alcoholic extract is an elegant form in which to employ it, in the above affections. In uterine diseases it may be given alone with advantage, or employed in combination with asclepidin, senecin, caulophyllin, or cimicifugin. In flatulent colic and borborygmi, a mixture of Dioscorein two grains, Ginger four grains, and Alcoholic Extract of Aletris two grains, may be divided into two pills, of which one may be given every two or three hours with decided benefit. (*See Asclepidin.*) The resinous extract of the root, *Aletrin*, is not so much employed at present as the alcoholic extract *Aletridin*, although it possesses active properties. Dose of the powdered root, from five to ten grains, three times a day; of the saturated tincture, from five to fifteen drops, in water.

Off. Prep.—Extractum Aletridis Alcoholicum.

ALISMA PLANTAGO.

Water Plantain.

Nat. Ord.—Alismaceæ. *Sex. Syst.*—Hexandria Polygynia.

THE LEAVES.

Description.—This is a *perennial*, caulescent herb, sometimes called *Mad-dog Weed.* The *leaves* are radical, oval, oblong or lanceolate, subcordate at the base, cuspidate or abruptly acuminate, five to nine nerved, from four to six inches in length, about two-thirds as wide, and on long radical petioles. The *scape* is one or two feet high, with whorled panicled branches; the *panicles* are loose, compound, many-flowered; branches of the panicle with bracts at the base. *Carpels* fifteen to twenty, obliquely obovate, forming an obtusely triangular whorl in fruit. The *flowers* are small, white, whorled, and numerous; *petals* three, tinged with purple, roundish, deciduous, larger than the green, ovate, persistent sepals. *Stamens* six; *achenia* obtusely three-cornered. *Root* fibrous.—*G.*—*W.*

History.—Water Plantain inhabits the North American continent, as well as Europe, growing in watery places, and flowering in July. The root was formerly considered efficacious in hydrophobia, but recent trials have shown it to be impotent. The leaves are the parts used.

Properties and Uses.—An infusion of the dried leaves is an excellent remedy in urinary diseases; the leaves, dried and powdered, have been successfully employed in gravel and other urinary affections. Dose of the infusion, from four to six fluidounces three or four times a day; of the leaves, one or two drachms. The fresh leaves bruised and applied to the skin, irritate and redden it, and not unfrequently will cause vesication.

ALLIUM SATIVUM.

Garlic.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE BULB.

Description.—There are over sixty species belonging to this genus. The *A. Sativum* has a *stem* about two feet high, leafy below the middle. The *bulbs* are clustered, very proliferous, many enveloped in the same silvery skin; the *leaves* are acute, distichous, glaucous, channeled above. The stem terminates in a head of flowers intermixed with bulbs, and enveloped in a calyptriform, horned *spathe.* *Umbels* bulbiferous. The *flowers*, if any, are pink, red, or whitish, rather longer than the stamens and appear in July. *Perianth* deeply six-parted, segments mostly spreading, permanent, equal; *ovary* angular; *stigma* simple, acute; *capsule* three-lobed. It is a native of Sicily, but cultivated in various sections of the country.—*L.*

History.—The bulbs of this plant are officinal; when removed from the ground some of the stem is left remaining, so that after desiccation by exposure to the sun, or in a warm room, several stems may be secured together, thus forming small bundles for sale. The root loses about one-half its weight by drying, but scarcely any of its smell or taste. All parts of this plant, but more especially the bulbs, have a strong, offensive, very penetrating and diffusible smell, and an acrimonious, almost caustic taste; both of these properties are owing to an acrid, volatile oil, of a yellowish color, heavier than water, and possessing in a strong degree the odor and taste of the plant; sulphur is one of its constituents; and in contact with the skin it occasions violent pain, rubefaction and frequently vesication. Garlic yields its properties to alcohol, acetic acid, and boiling water by infusion.

Properties and Uses.—Garlic is stimulant, diuretic, expectorant, and rubefacient; it is used both for medical and culinary purposes. The medicinal effects above stated are owing to the absorption of its volatile oil, the stimulating action of which causes thirst, promotes the activity of the various excretory organs, as the skin, kidneys, and mucous membrane of the air-tubes, communicating its odor to their excretions. It has been beneficially used in coughs, catarrhal affections, pertussis, hoarseness, worms, and calculous diseases, during the absence of inflammation. Externally, it has been employed as a resolvent in indolent tumors, and as a counter-irritant in cerebral and pulmonary affections. When applied along the spinal column and over the chest of infants, in the form of poultice, it is very useful in pneumonia; and placed over the region of the bladder, it has sometimes proved effectual in producing a discharge of urine when retention has arisen from torpor of the bladder. Garlic juice, oil of sweet almonds, and glycerin, of each equal parts, mixed, and dropped in the ear has cured several cases of deafness. The dose of fresh Garlic is a drachm or two; of the juice a small teaspoonful. Large doses cause nausea, vomiting, purging, and other unpleasant symptoms. The juice is often made into a syrup with sugar, by nurses, for coughs, catarrhs, and pulmonary affections of infants. The odor imparted to the breath, by Garlic and onions, may be very much diminished by chewing roasted coffee grains, or parsley leaves and seeds.

ALLIUM CEPA.

Onion.

Nat. Ord.—Liliaceæ. *Tribe.*—Scilleæ. *Sex. Syst.*—Hexandria Monogynia.

THE BULB.

Description.—The Onion has a *root* bearing a tunicated bulb, compressed, or round, or oblong in figure, invested with a shining, thin, dry membrane. The *scape*, which appears the second year, is from two to four feet high, straight, naked, smooth, stout, fistulous, bearing at the top a large, round umbel of greenish-white flowers, and swelling toward its base. The *leaves* are fistulous, terete, distichous, glaucous, acute, shorter than the stem. *Spathe* reflexed, generally longer than the lower flowers. *Umbels* large, regular, compact, many-flowered, not bulbiferous. *Pedicels* about an inch long, thickened at the point. *Stamens* nearly twice as long as the perianth.—*L.*—*W.*

History.—This biennial plant is supposed to be a native of Hungary, but is now found in all parts of the world. Onion bulbs are of various shapes and sizes, usually globular, tunicated, the layers being juicy, and having a dry external covering of a white or reddish color. They are less pungent to the taste than garlic, with some degree of sweetness, and a peculiar, well-known odor. According to Fourcroy and Vauquelin, Onion contains an acrid volatile oil, uncrystallizable sugar, gum, albumen, woody fiber, acetic and phosphoric acids, phosphate and citrate of lime and water.—*P.* The oil is colorless, acrid, and contains sulphur. A peculiar wine may be made by fermenting the juice of the Onion.

Properties and Uses.—Onion possesses properties allied to those of the garlic, but in a milder degree, and the absorption of its oil and influence upon the system is somewhat similar to that of the oil of garlic. Onions do not agree with all persons, especially dyspeptics, in whom they favor the production of flatus, which, however, is a common symptom among all those who eat largely of them; boiling, in a great measure, deprives them of this property. Sugar and onion juice form a syrup, much used in domestic practice, for cough and other affections of the air-tubes among children. A roasted onion employed as a cataplasm to suppurating tumors (*Coxe*), or to the ear in earache, has proved beneficial. Dr. B. Rorer recommends in epistaxis, a paste made by bruising the inner portion of the onion with an equal weight of flour, and sufficient vinegar to form a paste; this is applied by pressing it in the nostril from which the hemorrhage issues until filled, and then securing it with a bandage. This was found to act after alum, nutgall, and tincture of chloride of iron had failed. A saturated tincture of onions made with good Holland gin, has been found serviceable in gravel and dropsical affections.

ALNUS RUBRA.

Tag Alder.

Nat. Ord.—Betulaceæ. *Sex. Syst.*—Monœcia Tetrandria.

THE BARK.

Description.—This plant is the *Alnus Serrulata* of Aiton and Willdenow, and is known by the names of *Smooth Alder*, and *Common Alder*. It is a well-known shrub growing in clumps, and forming thickets on the borders of ponds and rivers, and in swamps. The *stems* are numerous, rather straight, and from six to fifteen feet high. The *leaves* are obovate acuminate, doubly serrulate with minute teeth, thickish, smooth and green on both sides, strongly veined, the veins and their axils being hairy beneath, from two to four inches long, by two-thirds as wide, and on petioles one-half or one-third of an inch long. The *stipules* are elliptical and obtuse. *Aments* two or three inches long, slender, pendulous, fascicled at the ends of the branches; *fertile aments* short, thick, dark-brown, persistent, ovoid-oblong, several together a little below the sterile one. *Stamens* four. *Fruit* ovate.—*W.*

History.—This shrub blossoms in March and April, bearing flowers of a reddish-green color. The bark is the part used and imparts its properties to boiling water.

Properties and Uses.—Tag Alder Bark is alterative, emetic, and astringent. A decoction or extract of it is useful in scrofula, secondary syphilis, and several forms of cutaneous disease. The inner bark of the root is emetic; and a decoction of the cones is said to be astringent, and useful in hematuria, and other hemorrhages. An excellent ophthalmic powder is made by boring a hole from half an inch to an inch in diameter, lengthwise, through a stout piece of a limb of Tag Alder. Fill the opening with finely-powdered salt, and close it at each end. Put it into hot ashes, and let it remain till the Tag is almost all charred (three or four days), then split it open, take out the salt, powder, and keep it in a vial. To use it, blow some of the powder upon the eye, through a quill. An article named *Alnuiné* is said to have been obtained from this plant, which possesses alterative, tonic, and astringent properties, and is recommended in herpes, syphilis, scorbutus, scrofula, impetigo, etc., in doses of one to three grains, three or four times a day. Likewise an essential agent, *Alnuin*, for the same purpose. We have not been advised of the manner in which these agents are prepared, and therefore can say but little concerning them.

Off. Prep.—Decoctum Alnûs. Infusum Alnûs.

ALOE SPICATA.

Aloes.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

INSPISSATED JUICE OF THE LEAVES.

Description.—The *Aloe Spicata*, or *Spiked Aloe*, inhabits the southern parts of Africa, where it grows in sandy soil. The *stem* is woody, round, about four feet high, and from three to five inches in diameter. The *leaves* are thick, fleshy, subverticillate, broad at the base, gradually narrowing to the point, full two feet long, channeled, distantly toothed, with a few white spots; their *parenchyma* almost colorless. *Spike* a foot long, very compact; *flowers* scarlet, horizontal, campanulate, and filled with a purplish honey. The three *petals* broader, ovate, obtuse, white with a triple green line; the *sepals* narrower, less concave. *Stamens* much longer than the perianth.—*L.* This tree furnishes the Cape Aloes of commerce.

Aloe Socotrina, inhabits the island of Socotra; its *stem* is woody, straight, a foot and a half high, or more, naked below, where it is strongly marked with the scars of leaves. *Leaves* are amplexicaul, ascending, ensiform, green, curved inward at the point, convex below, rather concave above, marked with numerous small white marginal serratures, the *parenchyma* abounding in a bright brownish-yellow juice. *Raceme* cylindrical, unbranched; *flowers* scarlet at the base, pale in the middle, green at the point. *Stamens* unequal, three of them longer than the flowers.—*L.* This tree furnishes the Socotrine Aloes of commerce.

Aloe Vulgaris grows in the East Indies and Barbary; is now cultivated in the West Indies, as well as in some of the southern sections of Europe.

Its *stem* is woody, simple, cylindrical, short; the *leaves* fleshy, amplexicaul, first spreading, then ascending, lanceolate, glaucous-green, flat above, convex below, armed with hard, distant, reddish spines perpendicular to the margin, a little mottled with darker color; the *parenchyma* slightly colored brown, and very distinct from the tough, leathery cuticle. *Scape* axillary, glaucous, reddish, branched. *Spike* cylindrical-ovate. *Flowers* at first erect, then spreading, afterward pendulous, yellow, not longer than the stamens.—*L.* This tree yields the Barbadoes Aloes of commerce.

There are several other species which furnish the medicinal aloes, but the three above named are supposed to yield the principal portion. The mucilaginous juice expressed from the parenchymatous tissue of the leaves has no remedial influences; but only that which is procured by incising the air-ducts of the leaves, transversely, so that the juice may flow from them, or, as stated by M. E. Robiquet, from the intercellular structure between them.

History.—*Cape Aloes* has a glossy or resinous fracture, a deep brown or olive color, with a greenish tint, a shining, smooth surface, and thin scales of it are nearly transparent, having a ruby color. Its odor is more powerful and unpleasant than the Barbadoes Aloes; its taste peculiar and bitter; and its powder is bright yellow, somewhat like gamboge, but having a greenish tint. The finer East Indian varieties are sometimes confounded with the Socotrine. *Socotrine Aloes* consist of small angular fragments of a yellowish or garnet-red color, a shining and unequal fracture, frequently roughish, a peculiar rather fragrant odor, and a bitter and disagreeable taste, though accompanied with some aromatic flavor. It is hard and friable in the winter, somewhat plastic in summer, and growing soft between the fingers; easily pulverizable; and when reduced to powder, of a bright golden color.—*Ed. Duncan.* *Barbadoes Aloes* is not so bright and clear as the Socotrine, is of darker color, more compact texture, drier though not so brittle, with a stronger and more disagreeable taste, being intensely bitter and nauseous, with little or nothing of the aromatic flavor of the Socotrine; it is extremely apt to induce hemorrhoids, and is principally used among veterinary physicians. The above named are the principal kinds of aloes met with in the shops; there are some others, but as they are rarely seen in this country, it will be useless to describe them.

Aloes is almost completely dissolved in boiling water, and as the decoction cools, the substance called *resin*, but which is the inert apothême, is deposited.—*Berzelius.* It should never be boiled for any length of time as its medicinal virtues are thereby diminished. It is dissolved by alcohol whether diluted or not. A clear solution made with cold water reddens litmus, gives a deep olive-brown color with sesquichloride of iron, is deepened in color by alkalies, is unchanged with gelatine, and forms a copious yellow precipitate with diacetate of lead. Heat occasions fusing, frothing, charring, and ignition, burning with a crackling noise, and a dense smoke which has the peculiar aloetic smell. All articles which precipitate its soluble principles, or which effect changes in them, are *incompatibles.* M. E. Robiquet has found the best Socotrine Aloes to contain 85 per cent. of bitter extractive or aloesin, 8 per cent. of albumen, and 4.5 per cent. of various salts, etc.—as ulmate of potassa, sulphate of lime, gallic acid, etc.

Properties and Uses.—Tonic, purgative, emmenagogue, and anthelmintic. In doses of from half a grain to a grain, two or three times a day, it exerts a decided tonic influence, but is seldom resorted to for this purpose. As a laxative and purgative, its applications are unbounded; it acts more especially on the muscular coat of the large intestines, rather increasing their peristaltic motion, than effecting copious thin or watery discharges; and from its tendency to produce heat and irritation about the anus, it is extremely improper for persons disposed to, or troubled with piles. When applied endermically to an ulcer or blistered surface, it purges as effectually and promptly as when taken into the stomach; ten grains used thus will purge in from six to ten hours. It is commonly supposed to have no action on the jejunum or ileum; and some imagine it to influence the duodenum, and especially the mouths of the biliary ducts, causing an increased flow of bile; stimulating the intestinal canal, when that secretion is suspended as in jaundice. It acts upon the uterus, promoting the menstrual flow, and which is partly owing to the stimulation of the organ, and the determination of blood toward it, occasioned by the medicine. It is said that one to three grains of extract of Hyoscyamus, or Hops, or two grains of Ipecacuanha, mixed with the Aloetic dose, will prevent its irritating effect on the lower intestines. An increase of the quantity of aloes beyond the medium dose, is not attended by a corresponding increase of effect. Aloes has been efficacious in constipation, dyspepsia, and ascarides; in this last instance being used in form of injection, ten grains to three ounces of water, for children. In chlorosis and amenorrhea it has often proved serviceable, and is used for this purpose in various combinations. In cases of delicate females, with loss of appetite, torpor of the bowels, and suffering with suppression of the menses, the following has been recommended for the purpose of exciting proper ovarian or uterine action: Take of best Aloes, pulverized, Assafœtida, pulverized, *of each half a drachm*, Cantharides, pulverized, *twenty grains;* mix and rub well together with a little Soap, and divide into twenty pills. Of these give from one to three, three times a day. If the patient be very feeble, some of the Salts of Iron may also be added. Injections of Aloes, composed of from ten to thirty grains dissolved in two or three fluidounces of water, and thrown up the rectum daily, and continued for a week previous to the menstrual period, have sometimes proved effectual.

Aloes should never be given in inflammatory affections, in irritable, plethoric habits, in gastritis, enteritis, where piles are present, to females liable to sudden uterine evacuations, nor during pregnancy. In hemorrhoids it may be given when modified by combination. Soap, or an alkaline carbonate, lessens its irritant action. The union of other purgatives with Aloes, often modifies its tendency to irritate the rectum. One grain of Aloes with two or three grains of sulphate of iron, will also modify this action, and will produce as much effect as two or three grains of Aloes. As a cathartic, Aloes will be found useful in habitual constipation from intestinal torpor, jaundice, scrofula, hypochondriasis, and where there is a tendency to cerebral congestion. Dose of Aloes, is from two to ten, or even twenty grains; and the most convenient form of administration is that of pill. It enters as a constituent into a great number of useful compound remedies.

Off. Prep.—Decoctum Aloës Compositum; Enema Aloës Composita; Extractum Colocynthidis Compositum; Pilulæ Aloës Compositæ; Tinctura Aloës; Tinctura Aloës et Myrrhæ.

ALOËSIN.

Bitter Extractive of Aloes.

Preparation.—M. E. Robiquet obtained Aloësin by exhausting powdered Aloes with cold Distilled Water; evaporating the infusion one half, over a water bath; adding an excess of neutral Acetate of Lead, which precipitated a light-yellow flocculent substance. To the clear liquor, Ammonia was added, which precipitated the Aloësin combined with Oxide of Lead, of an orange color. This precipitate was quickly separated and washed with Boiling Water, and then decomposed in water with Sulphureted Hydrogen, atmospheric air being shut out. The precipitate of Sulphuret of Lead was separated from the colorless liquor by filtration, and the latter being evaporated in vacuo, deposited Aloësin.—C.

History.—"Thus prepared, Aloësin is in colorless, or pale-yellow scales, like a varnish, non-crystalline, of a powerful aloëtic taste, soluble in cold water, alcohol, and especially weak spirit, sparingly soluble in ether, and not at all in fixed or volatile oils. Its aqueous solution, when exposed to the air, owing to oxidation, becomes dark red; it is not precipitated by iron salts, acetate of lead, isinglass solution, or infusion of galls. Heat, exposure, and moisture convert it into an insoluble, inert oxygenated extract."—C.

Properties and Uses.—Same as Aloes. Eight grains of Aloësin being equal to ten of Socotrine, and fifty of Cape Aloes.

ALOÏNE.

The Purgative Principle of Barbadoes Aloes.

Preparation.—Pulverize the Aloes with sand, and then treat it with Cold Water; strain off the liquid, and evaporate it in vacuo to a syrupy consistence—set it aside for a few days, when it will be filled with a mass of brownish-yellow granular crystals. This is impure Aloïne. To remove the brown matter associated with it, re-crystallize it repeatedly from Warm

Water, until the crystals are of a sulphur-yellow. In making these solutions, the temperature of the water should not exceed 150° F. At 212° Aloïne oxidizes rapidly, and is decomposed.

History.—When pure, it crystallizes in stellated groups of small prismatic needles, whose purity is shown by the color, which should not deepen by exposure to the air in desiccation. It is completely neutral, sparingly soluble in cold water, but readily in warm, with a taste, at first sweetish, but soon becoming intensely bitter. Its solutions in the alkalies and their carbonates is of an orange-yellow, and the liquid absorbs oxygen upon contact with the atmosphere, which rapidly deepens its color. Boiled with alkalies or acids, it is speedily transformed into a brown resin. Corrosive sublimate, nitrate of silver, or neutral acetate of lead, do not cause its precipitation; concentrated subacetate of lead produces a precipitate of an intense yellow, soluble in excess of water, and becoming deeper colored on exposure. Cold fuming nitric acid dissolves it, without disengaging gas, forming a reddish-brown liquid; to which, if sulphuric acid be added in great excess, a yellow pulverulent body is thrown down, which explodes when heated. By dry distillation, Aloïne furnishes a slightly aromatic, volatile oil, and a quantity of resinous substance. It forms crystallized compounds with bromine, but not with chlorine, although it combines equally well with this latter. Bromine, added to a cold aqueous solution of Aloïne, instantly forms a yellow precipitate, while the supernatant liquid assumes a very acid reaction, consequent upon the formation of hydrobromic acid. By dissolving the precipitate in warm alcohol, and cooling the solution, bromated Aloïne is obtained in brilliant yellow needles, grouped in stars.

Properties and Uses.—Same as aloes. Dose of Aloïne, one fourth of a grain to a grain.

ALPINIA CARDAMOMUM.

Cardamom.

Nat. Ord.—Zingiberaceæ, *Lindley.* Scitamineæ, *Brown.* *Sex. Syst.*—Monandria Monogynia.

THE FRUIT. CARDAMOM SEED.

Description.—*Alpinia Cardamomum* has a knobbed, perennial rhizoma, with many fleshy radicles; the *stems* are numerous, erect, simple, jointed, enveloped in the spongy sheaths of the leaves, and about four or six feet high. The *leaves* are bifarious, subsessile on their sheaths, lanceolate, fine-pointed, somewhat villous above, sericeous underneath, entire, and one or two feet long, and nearly half a foot broad. The *sheaths* are slightly villous, with a rounded ligula rising above the mouth. There are from three to five *scapes* proceeding from the base of the stem, which are from one to two feet long, lying upon the ground, flexuose and jointed; the *branches* or *racemes* alternate, one from each joint of the scape, suberect, and two or three inches long. *Bracts* solitary, oblong, smooth, membranous, striated, sheathing, one at each joint of the scape. *Flowers* alternate, short-stalked, solitary at each joint of the racemes, opening in succession as the racemes lengthen. *Calyx* monophyllous, funnel-shaped, three-toothed at the mouth, about three quarters of an inch long, striated with fine veins, permanent. *Tube of corolla* slender, as long as the calyx; *limb* double, exterior of three, oblong, concave, nearly equal, pale greenish-white divisions; *inner lip* obovate, much longer than the exterior divisions, somewhat curled at the edge, with the apex slightly three-lobed, marked chiefly in the center with purple violet stripes. *Filament* short, erect. *Anther* double, emarginate. *Ovary* oval, smooth. *Style* slender. *Stigma* funnel-shaped. *Capsule* oval, somewhat three-sided, size of a small nutmeg, three-celled, and three-valved; *seeds* pale-brown, coriaceous, numerous.—*L.*

History.—*Alpinia Cardamomum*, or rather *Elettaria Cardamomum*, inhabits the mountainous parts of the coast of Malabar, where it grows without cultivation. The fruit, which is the officinal part, is not obtained until the shrub has reached its utmost height, which requires four years; it consists of an obtusely triangular, oblong, coriaceous capsule, ribbed, grayish-yellow, and from one or two lines to nearly an inch in length. They contain about 75 per cent. of numerous, nearly triangular, rugose seeds, of a dark-brownish color externally, white within, having a fragrant, camphoraceous odor, and an agreeable, intensely aromatic taste. The seeds contain the active properties, while their covering, which has very little smell or taste, should be rejected; the flavor of the seed is soon lost when deprived of the capsules covering them. Water or alcohol takes up the virtues of the seeds, which Trommsdorf found, in 1834, to be due to a colorless, strongly fragrant, volatile oil, of sp. gr. 0.943, which is very soluble in alcohol, ether, oils, and acetic acid; insoluble in potash-ley. By keeping it becomes yellow, viscid, and loses its peculiar taste and smell; its constitution is $C_{10} H_8$.—*P.*

Properties and Uses.—Cardamom seeds are very warm, grateful, pungent and aromatic, and form an agreeable addition to bitter infusions, and other medicinal compounds. They are chiefly employed as a carminative in flatulency, and to flavor syrups, tinctures, etc. Dose of the powder, from ten grains to two drachms.

Off. Prep.—Syrupus Stillingiæ Compositus; Tinctura Cardamomi; Tinctura Cardamomi Composita.

ALTHÆA OFFICINALIS.

Marsh-Mallow.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE ROOT.

Description.—Althæa Officinalis is a peculiarly soft, and downy, hoary, green herb, having a tap-shaped, rather woody *root.* The *stems* are several, erect, from two to five feet in height, simple, round, leafy, tough, and pliant. The *leaves* are ovate or heart-shaped at the base, various in breadth, plaited, five-ribbed, unequally serrated, petioled, soft and pliable, more or less deeply divided into five acute lobes. The *flowers* are large, in very short, dense, axillary panicles, rarely solitary, and of a delicate, uniform, blush color. *Involucre* with 8, 9, 10, or 12 divisions. The *fruit* is formed of numerous capsular carpels, closely and circularly arranged around the axis, one-seeded.—*L.*

History.—This perennial herb is found commonly on the banks of rivers, and in salt marshes. It is indigenous to Europe, in some parts of which it is cultivated in great quantities for medical use, and moist sandy soils are preferred. It flowers from July to September. The whole plant, but especially the root, abounds with mucilage. Although the plant grows to some extent in the United States, the root is principally obtained from Europe for medical purposes, that which comes from Germany being much whiter but not so thick as that from the south of France. As met with in the shops, the root is in pieces three or four inches long, or more, roundish, about half an inch in diameter, with a feeble odor, and very mucilaginous taste. It should be chosen plump, and little fibrous; with a very white surface, well cleared of its yellowish epidermis, downy from the mode of dressing it with files. Sometimes it is met with divided lengthwise. The plant contains nearly twenty per cent. of mucilage.—*Ed. Duncan.*

Althæa Rosea, or *Hollyhock*, which is a native of China, but introduced into our gardens, likewise contains a considerable amount of mucilage, and is sometimes used as an emollient and demulcent.

The *Hibiscus Palustris* (or *H. Moscheutos*), Marsh Hibiscus, of this country, has a root very much resembling that of the Marsh-mallow, possesses exactly the same properties, and may be as effectually used. It is a tall, showy, perennial plant, growing in salt marshes, near salt springs, and on wet prairies, and flowers in August. The *stem* is simple, erect, herbaceous, round, downy, and from four to six feet in height. The *leaves* are from four to six inches, by three to four inches, often with two lateral lobes, ovate, obtusely dentate, and *hoary*-tomentose beneath. The *flowers* are larger than those of the hollyhock, rose-colored, purple in the center. *Peduncles* long, axillary, or connected with the petiole, usually distinct from it, but sometimes united with it, and jointed above the middle. *Styles* one inch longer than the stamens.—*W.*

Properties and Uses.—The roots of each of the above plants are demulcent and diuretic, and may be used indiscriminately, the one for the other. They will be found valuable, in the form of decoction, in diseases of the mucous tissues, as hoarseness, catarrh, pneumonia, gonorrhea, vesical catarrh, renal irritation, acute dysentery and diarrhea. In strangury, inflammation of the bladder, hematuria, retention of urine, some forms of gravel, and indeed in nearly every affection of the kidney and bladder, ir use will be found advantageous. I make much use of them combined with equal parts of spearmint, in urinary derangements. They are likewise efficacious in gastro-intestinal irritation and inflammation. Externally, they are very useful in the form of poultice, to discuss painful inflammatory tumors, and swellings of every kind, whether the consequence of wounds, bruises, burns, scalds, or poisons; and have, when thus applied, a happy effect in preventing the occurrence of gangrene.

Off. Prep.—Decoctum Althææ; Infusum Althææ.

ALUMEN.

Alum. Sulphate of Alumina and Potassa.

Aluminium, or *Aluminum* ($Al=14$) is the metallic basis of the earth Alumina. It is as white as silver, malleable and ductile in the highest degree. But when worked it appears to become harder, and its tenacity probably approaches nearly to that of iron. It may be hardened, and again softened by annealing. Its sp. gr. is 2.56. It may be melted and run out into the air without being sensibly oxidized. It is a good conductor of heat, and is completely unalterable in dry or moist air. It does not become tarnished, and remains bright by the side of freshly cut zinc and tin, while the latter lose their brilliancy. It is not acted upon by sulphureted hydrogen. Cold water has no action upon it, and boiling water does not tarnish it. Nitric acid either concentrated or diluted, and diluted sulphuric acid, when applied cold, are also without action upon it. Its true solvent is hydrochloric acid, which evolves hydrogen, and forms sesquichloride of aluminium. When heated to redness in hydrochloric acid gas, dry and volatile sesquichloride of aluminium is produced. It is lighter than glass, and is found in large quantity in nature, its ore being clay. If the chloride of aluminium be treated with sodium, and the mass be heated to bright redness in a porcelain crucible, the excess of chloride of aluminium will be driven off, and there will remain a saline mass having an acid reaction, in the midst of which will be found globules of varying size, of perfectly pure aluminium.—*Deville.*

History.—Common or potash alum, $KO, SO_3 + Al_2\,O_3\,3\,SO_3 + 24\,HO$, known by the name of *alum*, is the officinal article. It is chiefly found in volcanic countries, in the earths of which it exists naturally. Generally, however, it is obtained from native mixtures of pyrites and clay, or sulphuric acid and clay. In Great Britain it is prepared from *aluminous slate*, or *aluminous schist*, which is calcined, then submitted for some weeks to atmospheric influence, and finally lixiviated and concentrated by evaporation.—*P.*

Alum usually crystallizes in regular octohedrons, consisting of two four-sided pyramids applied base to base, frequently with truncated edges and angles, and sometimes in cubes. It has a sweetish but very astringent taste. It is soluble in fifteen times its weight of water at 60° F., and in three-fourths of its weight at 212°. It reddens vegetable blues, and slightly effloresces in the air.—*Ed. Duncan.* Exposed to a gentle heat, it fuses in its water of crystallization; a strong heat causes it to swell and foam, and to lose about 44 per cent. of its weight, consisting chiefly of water of crystallization, forming *burnt* or *dried alum.* A very strong heat expels its acid. It has the specific gravity 1.724.

Alum is decomposed by baryta, potassa, soda, strontia, and all salts of which these are the bases; by the nitrate, muriate, phosphate, carbonate, borate, and fluate of ammonia; by the nitrate, muriate, phosphate, and carbonate of magnesia; and by the nitrate, muriate, and carbonate of lime; also by gallic acid, coloring matters, and many animal and vegetable substances.

Properties and Uses.—In doses of from thirty to sixty grains, repeated every three or four hours, Alum exerts a purgative influence; if these doses be repeated every ten or fifteen minutes, they will cause vomiting. From five grains to a scruple, dissolved in some aromatic infusion, and repeated every three or four hours, will exert an astringent-tonic influence. As an astringent, Alum has been used in hemorrhages and immoderate secretions, as in diarrhea attending typhoid fever, night-sweats of exhausting diseases, passive bleeding from the lungs, stomach, kidneys, or uterus, fluor albus, etc. In the inflammatory stage of gonorrhea, it will often be found useful in solution with an infusion of marsh-mallow. In colic it has been found very useful when given in large doses, especially in that form of colic to which workers in lead are subject. In spasm of the glottis and diseases of the throat accompanied with membraniform exudation, it is advised in emetic doses. As an antispasmodic, it appears to exert a beneficial influence in pertussis. In several affections of the throat, Alum, in solution, may be beneficially employed as a gargle, or it may be finely powdered and blown upon the parts through a quill or small tube; thus used it will be found valuable in sore-throat, relaxed uvula, etc. Its solution may also be used as a wash for pytalism, and as an injection in gleet and leucorrhea, alone or conjoined with sulphate of zinc. It has likewise proved very useful in purulent ophthalmia of infants, and in the latter stages of conjunctival inflammation. In colica pictonum it may be given in doses of from thirty to sixty grains, every three hours; it mitigates all the unpleasant symptoms in this disease more promptly and permanently than any other remedy. It is often used externally, either in powder or solution, to check bleeding from the nose, excessive menstruation, and to check the bleeding from cut surfaces; it may be applied on lint, or on a small piece of sponge if used in solution. From four to ten grains of alum to the ounce of water, is of sufficient strength for a collyrium. I have found much advantage from the use of the following preparation in troublesome cough, especially when attended with tickling or irritation of the fauces, larynx, etc.: Take of a Saturated Solution of Alum, Syrup of Balsam of Tolu, each, two fluidounces, Camphorated Tincture of

Opium one fluidounce; mix. The dose for an adult is a tablespoonful three or four times a day, or whenever the cough is very troublesome. Several practitioners to whom I have recommended the preparation, have found it very efficacious.

ALUMEN EXSICCATUM.—Dried or Burnt Alum, sometimes called *Alumen Ustum*, is prepared by heating alum, until ebullition ceases, and it becomes dry. It is principally used as a mild escharotic, to destroy exuberant spongy granulations, known as proud flesh. It differs from Alum only in the absence of water.

ALUM WHEY is made by boiling Alum with Milk, in the proportion of five grains of the former to every fluidounce of the latter, and then straining off the thin liquor.—*C.* It may be given internally, in diarrhea, etc., in doses of from half an ounce to one or two ounces. Externally, applied over the eye as a poultice, it is very serviceable in inflammation of that organ.

Off. Prep.—Alumen Exsiccatum; Cataplasma Aluminis; Lotio Zinci Compositum; Pulvis Stypticus.

IRON ALUM has lately been brought to the notice of the profession by Dr. Wm. Tyler Smith and others. There are three Iron Alums, one with Potassa, $Fe_2\ O_3\ 3\ SO_3 + KO\ SO_3 + 24\ Aq$; another with Soda, $Fe_2\ O_3\ 3\ SO_3 + NaO\ SO_3 + 24\ Aq$; and the third with Ammonia, $Fe_2\ O_3\ 3\ SO_3 + NH_4O\ SO_3 + 24\ Aq$. Of these two have been used, viz: the *Potassio-sulphate of Peroxide of Iron*, and the *Ammonio-sulphate of Peroxide of Iron.* The first has long been used in St. Mary's Hospital, London, as a more powerful astringent than common alum, and not liable to produce the stimulating effects of other salts of iron; the second possesses similar properties. The first may be made by dissolving peroxide of iron in sulphuric acid, or by peroxidizing protosulphate of iron with nitric acid, and adding an equivalent of Sulphate of Potassa. If the salt with ammonia be required, sulphate of ammonia is added instead of sulphate of potassa. The solution, with excess of sulphuric acid, is to be evaporated until crystals are formed on cooling. Next to common alum and chrome alum, this is one of the most easily formed of the whole series. It is a beautiful, pale violet colored salt, more soluble than common alum, the solution having a reddish color. It may be distinguished from an alum containing protosulphate of iron, by the color of the precipitate formed on the addition of caustic potassa, which, with the salt under notice, will be brown, while with the other it will be green. It presents the octahedral form of common alum, but contains not a trace of alumina.—*Pharm. Jour., Jan.,* 1854, p. 306.

Mr. Wm. Hodgson, Jr., in Am. Jour. Pharm., XXVIII., p. 306, gives the following formula for preparing the "Ammonio-Ferric Alum," as he terms it: Boil pure crystallized Protosulphate of Iron, *eight Troy ounces* in *two pints* of Distilled Water, and add to it gradually Sulphuric Acid *seven fluidrachms;* when dissolved, add, in small portions gradually, Nitric Acid (common strength or 36° B.) *two and a half fluidounces*, or *a sufficient quantity*, boiling for a minute or so after each addition, until the Nitric Acid ceases to produce a black tint in the liquor. The complete change of the Protosulphate of Iron to a Persulphate, is, toward the last, accompanied by a violent boiling and evolution of Deutoxide of Nitrogen; rendering it necessary to use a vessel for the operation capable of holding double the quantity put into it. Boil the solution of Persulphate of Iron to about half its volume; then add Sulphate of Ammonia *two ounces and two drachms*, Troy weight, and set it aside for spontaneous evaporation and crystallization. Wash the crystals rapidly but thoroughly in very cold water, then press them wrapped in copious folds of bibulous paper, and afterward dry them in the open air. The crystals should be nearly colorless, but with a slight dark tint. They are octohedrons, usually truncated. They are very soluble in water.

Dr. Wm. Tyler Smith speaks very highly of these iron alums in leucorrhea, in doses of from three to six grains, in infusion of colombo, or in water, repeated three times a day. It has also been found useful in choleraic diarrhea, dysentery, and other disorders in which tonicity and astringency are required. It is more effective than the sesquichloride of iron, being at the same time less stimulating, more easily assimilated, and rarely causing any nausea or headache. Occasionally it induces slight constipation, which may be obviated by an occasional laxative.

AMARANTHUS HYPOCHONDRIACUS.

Amaranth.

Nat. Ord.—Amaranthaceæ. *Sex. Syst.*—Monœcia Pentandria.

THE LEAVES.

Description.—Amaranthus Hypochondriacus is an annual herb, with a stout, upright *stem*, and growing from three to four feet high. The *leaves* are oblong, lanceolate, mucronate, green with a red-purple spot, or tinged with purple; *flowers* clustered in racemes, and of a bright-red purple, as well as the awl-shaped bracts. *Racemes* pentandrous, compound, erect, compact. *Stamens* five. The whole plant is dark red, or reddish-purple, with long plume-like clusters.—*G.*—*W.*

History.—This plant, also known by the names of *Princes' Feather*, *Lovely Bleeding*, *Red Cocks-comb*, etc., is a native of the Middle States, and is cultivated as an ornamental plant in gardens. It bears deep bright-red flowers in August. The leaves, which are the parts used, are also red, and yield their virtues to water.

Properties and Uses.—Amaranth is astringent. The decoction drank freely is highly recommended in severe menorrhagia, and has also been found beneficial in diarrhea, dysentery, and hemorrhage from the bowels. It has likewise been used as a local application in ulceration of the mouth and throat. in leucorrhea, and as a wash to foul, indolent ulcers.

AMBROSIA TRIFIDA.

Tall Ambrosia.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Monœcia Pentandria.

THE LEAVES.

Description.—Ambrosia Trifida is variously known by the names *Horse-weed*, *Bitter-weed*, *Great Rag-weed*, *Horse-cane*, *Rich-weed*, etc. It is a rough, hairy, herbaceous, annual plant, with an erect, branching, furrowed *stem*, from five to ten feet in height. The *leaves* are opposite, from four to seven inches broad, scabrous and hairy, with three large, deep lobes which are oval, lanceolate, acuminate and closely serrated; the *lower leaves* are often five-lobed. *Petioles* narrowly-winged, ciliate; *racemes* often paniculate. *Flowers* mean and obscure, in long leafless spikes, axillary and terminal. *Fruit* (fertile involucre) turbinate-obovoid, with a short conical pointed apex, six-ribbed, the ribs terminating in as many cristate tubercles.—*W.*—*G.*

History.—This plant grows in low grounds and along streams, from Canada to Georgia, and west to Louisiana and Arkansas, bearing greenish-yellow flowers in August. It is much in use among farmers, for the "slabbers" in horses, effecting a cure in a few hours. It has a spicy, pleasant, aromatic taste, slightly resembling ginger, and imparts its properties to water.

Properties and Uses.—This plant is slightly stimulant, astringent, and antiseptic. Useful in decoction as an injection in leucorrhea, prolapsus uteri, chronic gonorrhea, and gleet; also valuable as a collyrium, in ophthalmia, and as a wash or gargle—with its internal use also—in the sore mouth of nurses. It will be found an excellent application to mercurial, and all other ulcers of a fetid or gangrenous character. As a remedy for mercurial salivation, used every half-hour as a wash, it is said to be prompt and efficacious. Internally, the decoction is useful in fevers, attended with a disposition to putrescency, diarrhea, and dysentery. Dose of the decoction from one to two ounces. Two preparations are said to have been obtained from this plant, called *Ambrosine* and *Elatine*. The former, it is stated, is found associated with elatine, and forms beautiful and brilliant, pearl-like, prismatic crystals with sulphuric acid; it is tasteless and inodorous, and can be retained on the most sensitive stomach. It is recommended as a tonic, diuretic, and alterative in dropsical affections with great loss of vitality; in nephritis and albuminuria; likewise in diabetes, consumption, scrofula, etc. Dose, one to three grains, three to six times a day. If this agent is as effectual as its manufacturers state, it will become one of the most valuable in the Materia Medica. *Elatine* is obtained in the form of a white, flocculent precipitate. Properties and dose similar to ambrosine. We have not been able to learn the mode of preparing these articles.

The AMBROSIA ARTEMISIÆFOLIA (*A. Elatior*), Roman Wormwood, or Rag-weed, has a slender stem, rising from one to three feet high, much branched, and pubescent when young; the *leaves* are opposite, and the upper alternate, twice pinnatifid, smoothish above, paler or hoary beneath; *barren flowers* small, green, in terminal racemes, or spikes loosely panicled; the *fertile ones* sessile about the axils of the upper leaves; *fruit* obovoid, or globular, pointed, armed with about six short acute teeth or spines.—*W.*—*G.* It is sometimes called *Hog-weed.* It is very common in all our fields, and would probably prove fully as efficacious, if not more so than the *A. Trifida.* It is highly recommended as a fomentation in recent inflammation from wounds or injuries of any kind. Made into a salve by bruising the green leaves, and simmering them in spirits and cream, it is very useful in hemorrhoidal tumors, and some forms of ulcer.

AMMONIACUM.

Gum Ammoniac.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE CONCRETE JUICE OF DOREMA AMMONIACUM.

Description.—The *Dorema Ammoniacum* is a glaucous green plant looking like opoponax. The *root* is perennial and large, with smooth *stems*, eight or ten feet high, over an inch in diameter at base, and having petiolate *leaves* about two feet long, somewhat bi-pinnate; *pinnæ* in three pairs; *leaflets* inciso-pinnatifid, with oblong, mucronulate, entire, or slightly lobed segments, from one to five inches long, and half an inch to two inches broad; *petiole* downy, very large, and sheathing at the base. *Umbels* proliferous, racemose; partial umbels globose, on short stalks, often arranged in a spiked manner. *General and partial involucre* wanting. *Flowers* sessile, immersed in wool. *Teeth of calyx* acute, membranous, minute. *Petals* white, ovate, reflexed at the point. *Disk* large, fleshy, cup-shaped. *Fruit* elliptical, compressed, buried in wool, surrounded by a broad flat edge; dorsal primary ridges distinct, filiform; lateral confluent with the margin; secondary ridges slightly elevated, rounded. *Vittæ*, one beneath each secondary ridge, one beneath each of the broad, marginal, primary ridges, and two on each side of the suture of the commissure, the external ones being very minute.—*L.*

History.—From a want of correct knowledge of the plant furnishing this gum-resin, it was formerly considered a *Ferula*, but specimens of the Persian plant having been investigated by Don, he ascertained that although it was somewhat related to this genus, yet it differed from it in several characters; he, therefore, gave to it its present name. The plant grows on arid, exposed situations in several parts of Persia, and in the course of the summer it is replete with a lacteous gelatinous juice, which is readily obtained. Mr. Jackson says: "It is remarkable that neither bird nor beast is seen where this plant grows, the vulture only excepted. It is, however, attacked by a beetle, having a long horn proceeding from its nose, with which it perforates the plant, and makes the incisions whence the gum oozes out." Col. Johnson states that "in the month of May, while the plant is soft, an insect of the beetle kind begins to puncture the stem in every direction with his proboscis," etc. Capt. Hart gives a similar account. But Fontanier asserts that it flows naturally, and is gathered in June. It is still supposed, however, to be sometimes furnished by other and dissimilar plants of Asiatic, as well as African growth.

Gum Ammoniac is not a pure gum, but a gum resin; it is met with in tears and in lump. The tears vary in size from that of a small pea to that of a walnut, are of a yellowish or pale reddish color externally, opalescent internally when recently fractured, are hard and brittle at ordinary temperatures, and soften by the heat of the hand. The lump Ammoniac varies in appearance, according to its quality. The best kind is composed chiefly of tears agglutinated together, though foreign impurities are frequently present. Ammoniac in either form has a faint, peculiar odor, and a bitter, nauseous, and acrid taste. It does not melt, but softens by heat; at a red heat it burns with a white flame. It may be partly dissolved by water, forming a white emulsion, which upon standing precipitates a resinous portion, leaving the supernatant liquid clear. Alcohol dissolves more than one-half, the remainder being a resin insoluble in this liquor, and the soluble white resin is precipitated by the addition of water to the alcoholic solution. Ether dissolves resin and volatile oil, leaving the gum. Vinegar forms a smooth, uniform emulsion with it, but does not dissolve it. Mr. Hatchett found it soluble in alkalies. The specific gravity of Ammoniac is 1.207. The *resin* of Ammoniac is reddish or yellow, transparent, tasteless, but having the odor of the gum-resin, is brittle, softens in the hand, melts at 130° F., and is soluble in alcohol. Ether separates it into an insoluble resin, and a resin soluble in sulphuric acid, and fixed and volatile oils. Alkalies form a cloudy solution. Nitric acid converts it into a yellow bitter matter, soluble in hot alcohol and water, and which will dye silk a fine yellow color without being affected by chlorine. The *gum* is reddish yellow, transparent, brittle, somewhat bitter, soluble in water, from which it is precipitated by subacetate of lead; and is converted into mucic, malic, oxalic, etc., acids by the action of nitric acid. The *oil*, which may be obtained by distillation of the gum resin with water, is transparent, colorless, and lighter than water. Ammoniac has been analyzed by Braconnot, Bucholz, Hagen, and others, and appears to consist of a large proportion of resin, with gum, bassorin, volatile oil, and water.

Properties and Uses.—Gum ammoniac possesses stimulant, antispasmodic and expectorant properties, and is said to purge in inordinate doses. It has been found especially useful in chronic affections of the respiratory organs, especially among the aged, or those in whom the expectoration is scanty, as in cough, asthma, etc.; and has likewise been found advantageous in profuse mucous discharges, the result of weakness of the parts involved, as in bronchitis or laryngitis, catarrh, leucorrhea, etc. It has also been advised in hysteria, but is inferior to some other of the fetid gum resins, as assafœtida. Applied externally in the form of plaster, it irritates the skin, frequently producing a papular eruption, and has been employed beneficially in this way, as a resolvent to indolent buboes, white swelling, tumors of the joints, chronic glandular enlargements, and other indolent swellings. The dose is from five to thirty grains in pill, or in emulsion.

AMMONIA.

Ammonia.

History.—Ammonia was unknown to the ancients; it was discovered in a state of solution by Black in 1756, and in the pure gaseous condition by Priestley in 1774. It is supposed to be the oxide of a metal which has been termed ammonium, and has the formula NH_3; equivalent weight, 17; and specific gravity, 0.591.

Ammonia may be obtained from any one of its salts by the process of single decomposition; but on account of its cheapness it is most generally obtained from the muriate of ammonia or sal ammoniac, acted on by lime. The chemical changes that occur are disengagement of the Ammonia, and a union of the lime with the hydrochloric acid, forming chloride of calcium and water. Under ordinary atmospheric temperatures and pressures ammoniacal gas is permanent; but at 50°, and under a pressure of six atmospheres, it is condensed into a colorless, very mobile liquid, of the density of 760. It is an invisible gas, possesses an acrid, alkaline taste, and a highly acrid, peculiar, urinous odor, rendering it irrespirable, and causing spasm of the glottis on attempting to inhale it; animal textures are irritated and inflamed by it. Its action is strongly alkaline, turning reddened litmus paper purple, turmeric brown, and blue cabbage green. It combines readily with acid, forming crystallizable salts which are either sublimed or decomposed by heat,—those with volatile acids being sublimed without change, while those with fixed acids part with their Ammonia. In contact with a gaseous acid, the two gases unite, and solidify, forming a white powder. It is absorbed by alcohol, but more especially by water. Water of 59° F., at the atmospheric pressure of thirty inches absorbs 670 times its volume of Ammonia. The salts of Ammonia are divided into *hydracid salts*, in which it is supposed that when Ammonia unites with a hydracid, it takes the hydrogen of the acid and forms ammonium NH_4, which then unites with the radical of the acid; and *oxyacid* salts, in which the oxyacids form salts with the oxide of ammonium. Thus sal ammoniac

$NH_4\ Cl$, is a hydracid salt, and sulphate of ammonia $NH_4\ O\ SO_3$, is an oxyacid salt. This is the theory of Berzelius, and is pretty generally adopted by chemists.

Off. Prep.—Liquor Ammoniæ; Liquor Ammoniæ Acetatis; Liquor Ammoniæ Fortior; Linimentum Ammoniæ; Tinctura Castorei Ammoniata; Tinctura Guaiaci Ammoniati; Tinctura Valerianæ Ammoniata; Ammoniæ Carbonas; Ammoniæ Hydrochloras; Ammoniæ Phosphas.

AMMONIÆ HYDROCHLORAS. (*Ammoniæ Murias.*)

Chlorohydrate, or Muriate of Ammonia.

SAL AMMONIAC.

History.—"Hydrochlorate of ammonia is found native, especially in the neighborhood of volcanoes. It was first prepared in Egypt from the soot of camel dung by sublimation." At present it is prepared in various ways, for instance, by the union of hydrochloric acid gas and ammoniacal gas; or by the double decomposition of sulphate of ammonia and muriate of soda. The sulphate of ammonia is obtained from various sources; sometimes by lixiviating the soot of coal, sometimes by decomposing with sulphuric acid the ammoniacal salts contained in the watery fluid which is formed in manufacturing coal gas, and sometimes by decomposing with sulphate of lime or sulphate of iron the impure carbonate of ammonia produced by the destructive distillation of animal refuse, but more especially in the preparation of animal charcoal from bones.

The hydrochlorate of ammonia which is consumed in the United States, is of foreign manufacture; the *crude* variety being imported from Calcutta; the *refined* from England. It is usually sold in thick cakes, convex on one surface, concave on the other, colorless, translucid, tough, fibrous, permanent in the air, no odor, but possessing a pungent, saline, acrid taste. It is an anhydrous salt, and consists of one equivalent, each, of hydrochloric acid and ammonia, or 17.15 of ammonia, and 36.42 of acid, $NH_4 + H\ Cl$, or according to the new view taken of the constitution of ammoniacal salts, it is the *protochloride of ammonium*, $NH_4\ Cl$. Its specific gravity is 1.45. It is soluble in two and a half parts of water at 60°, and in one part at 212°,—cold being produced during the solution. It is also partially soluble in alcohol. It is odorless, of a sharp, somewhat alkaline taste, has a faintly acid reaction, is permanent in the ordinary state of the atmosphere, is reduced to a white powder by a gentle heat, and at a temperature below redness it sublimes unchanged without previous fusion. It is not readily reduced to powder, but this may be accomplished by making a strong aqueous solution, heating it to 212°, stirring it constantly until it is cold; by this process granulation of the salt takes place, and after thoroughly drying it, it may be easily pulverized. It is decomposed by sulphuric and nitric acids; by baryta, potassa, soda, strontia, and lime;

by salts containing these acids or bases; and by those metallic salts whose bases form an insoluble compound with hydrochloric acid.

Properties and Uses.—Muriate of ammonia, according to its mode of employment is refrigerant, laxative, diaphoretic, or diuretic. "It acts primarily on the intestinal canal, as an irritating stimulus."—*Ed.* Its action upon the general system is to promote secretion and exhalation generally, soften and break down textures, check phlegmonous inflammation, lessen inflammatory effusions and promote their re-absorption. Prof. C. H. Cleaveland states that it acts upon all the tissues of the system, producing the solvent effects accorded to mercurials, but without their injurious consequences. In very large doses, it acts as a narcotic irritant, producing inflammation of the alimentary canal, and also coma and tetanic convulsions. It has been recommended internally in all tuberculous diseases, in chronic pulmonary affections, rheumatic face-ache, hemicrania, ischuria, chronic dysentery, amenorrhea the result of deficient uterine action, and in all chronic diseases of mucous or serous tissues. From five grains to half a drachm is the dose, which may be repeated three or four times a day; it may be given in the form of powder, mixed with powdered gum or sugar, or dissolved with syrup, mucilage, extract of liquorice, etc. In large doses it purges, but in small doses it rather constipates the bowels. It may be given for a long time without any inconvenience, but at last it impairs the digestive powers.—*Ed. Duncan.* As Cholagogue, — by [illegible]

As an external application, it is used in the form of plaster or lotion, as a stimulating discutient, and has been found valuable in chilblains, "indolent tumors of all kinds, contusions, gangrene, psora, ophthalmia, cynanche and in stimulating clysters." When first applied, in solution, the coldness will diminish the sense of heat and uneasiness of the part, and the subsequent stimulus will excite a more healthy action in the vessels. For these purposes, a favorite lotion with Prof. Cleaveland is a mixture of two drachms of Hydrochlorate of Ammonia dissolved in one fluidounce of Distilled Water, to which one fluidounce of tincture of Conium Mac. is subsequently added. In erysipelas and erysipelatous inflammations, I have found the following mixture an excellent local application: Take of Muriate of Ammonia one ounce, Distilled Water half a pint; mix, and dissolve, then add Tincture of Camphor four ounces, Tincture of Lobelia four ounces. To be shaken each time previous to bathing with it. It allays the burning heat and itching, and in many instances assists in preventing the further development or extension of the disease. As a gargle, in the chronic form of cynanche tonsillaris, it is often serviceable, in solution; one or two drachms of the Hydrochlorate to about two or two and a half fluidounces of Water, and four fluidrachms of Alcohol. In fluor albus and gonorrhea (as well as for a wash in scabies and ulcers), from one drachm to half an ounce may be dissolved in twelve or sixteen fluidounces of Water, and used as an enema.

Off. Prep.—Ammoniæ Carbonas; Liquor Ammoniæ.

AMPELOPSIS QUINQUEFOLIA.

American Ivy.

Nat. Ord.—Vitaceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK AND TWIGS.

Description.—This is a woody vine, with a rooting, climbing stem—quinate and digitate *leaves; leaflets*, oblong, acuminate, petiolate, dentate, smooth, and turn crimson in autumn; *flowers* inconspicuous, greenish, or white, in dichotomous clusters; *calyx* entire; *petals* five, distinct, spreading; *ovary* two-celled, cells two-ovuled; *style* very short; *berries* dark-blue, acid, smaller than peas, and two-celled, cells one or two-seeded.— *W.*

History.—The American Ivy is a common and familiar shrubby vine, climbing extensively, and, by means of its radicating tendrils, supporting itself firmly upon trees, ascending to the height of fifty feet; in the same manner it ascends and overspreads walls and buildings; its large leaves constituting a luxuriant foliage of dark glossy green. It is found in wild woods and thickets throughout the United States, and blossoms in July, ripening its small blackish berries in October. In various sections it has different names, as *Woodbine*, *Virginian Creeper*, *Five Leaves*, *False Grape*, *Wild Wood Vine*, etc. The bark and twigs are the parts used. Its taste is acrid and persistent, though not unpleasant, and its decoction is mucilaginous. The bark should be collected late in the fall, after the berries have ripened.

Properties and Uses.— Alterative, tonic, astringent, and expectorant. Used principally in form of syrup in scrofula, syphilitic affections, and wherever an alterative is required. It has also been recommended in dropsy, bronchitis and other pulmonary complaints. Dose of the syrup or decoction, two to four ounces, three times a day.

Off. Prep.—Decoctum Ampelopsis; Infusum Ampelopsis.

AMYGDALA COMMUNIS.

Almond Tree.

Nat. Ord.—Drupaceæ (*De Candolle*), Rosaceæ. *Suborder*, Amygdaleæ. *Sex. Syst.*—Icosandria Monogynia.

KERNELS.

AMYGDALA AMARA.—*Bitter Almonds.*

AMYGDALA DULCIS.—*Sweet Almonds.*

Description.—The Amygdalus Communis or Almond tree is from ten to eighteen feet high, with a pale-brown rugged bark and dividing into many spreading branches. The *leaves* are upon glandular petioles, between two and four inches long, about nine lines broad, lanceolate, acuminate, thin, serrated, bright light-green, and glandular near the base.

The *flowers* are moderately large, pink or white, sessile, in pairs, and appearing before the leaves. *Calyx* reddish, with blunt segments. *Petals* variable in size, always much larger than the calyx, ovate, concave, irregularly notched. *Stamens* spreading, about half the length of the petals. *Ovary* woolly; *style* simple. *Fruit* a leathery, hoary drupe, with the sarcocarp spontaneously cracking and dropping off the putamen. *Stone* oblong, or ovate, acute, hard in various degrees, always rugged, and pitted with irregular holes. *Seed* oblong, compressed, ovate, with brown testa, at the apex of which there is a broad round brown chalaza. *Cotyledons* very large, plano-convex. Both the sweet and bitter almonds are taken from this tree, of which there are several varieties—the sweet almond is obtained from the *A. Dulcis*, and the bitter almond from the *A. Amara.—L.*

History.—The Almond tree is indigenous to most of the southern parts of Asia, and Barbary, and is cultivated in many parts of southern Europe. The best of the sweet kind come from Malaga. The sweet almond kernel is without odor, and of a pleasant flavor; that of the bitter almond is also inodorous, unless it be rubbed with water, when it exhales a smell similar to that of prussic acid—its taste is similar to that of peach-meats. Both varieties of kernel contain oil; the *sweet*, a fixed oil; the *bitter* a fixed oil, and an essential oil impregnated with hydrocyanic acid. The fixed oil may be obtained by expression; it is colorless or slightly yellowish, sweet and bland to the taste. The essential oil may be obtained from the bitter almonds by distillation with water, after having deprived them of their fixed oil. This oil, called Oil of Bitter Almonds, has a golden yellow color, an agreeable odor, and an acrid, bitter taste; it is combustible, burning with a white flame, of specific gravity varying from 1.052 to 1.084, soluble in alcohol or ether, communicates its odor and taste to water, and yields foliaceous crystals upon standing for a time exposed to the atmosphere. The volatile oil of bitter almonds is not a natural product, but is owing to the action of water on the *amygdalin* and *emulsin* of the kernels; amygdalin may be obtained from bitter almonds in a crystalline form. The oil of bitter almonds is a poison acting in the same manner as hydrocyanic acid. One drachm of it dissolved in three fluidrachms of alcohol, forms an "essence of almonds," much used by confectioners, perfumers, etc.

Beside its great specific gravity and peculiar smell, any adulteration of oil of bitter almonds may be detected by the following characteristics, viz.: its great, clear solubility in sulphuric acid, with a reddish-brown coloration, and without any visible decomposition; the very slow action which nitric acid has upon it, without either of the two substances undergoing any change in its physical properties; the only partial slow solution of iodine without further reaction; its indifference to chromate of potash; the elimination of crystals from its solution in an alcoholic solution of caustic potassa; the peculiar inspissation by caustic ammonia and muriatic acid, and the elimination of crystals from the alcohol solutions of these new compounds; and lastly, its decidedly acid reaction.—*Zeller.*

A potassa soft soap, made with lard and perfumed with essential oil of almonds is sold as a shaving soap, under the name of *Saponaceous Cream of Almonds.* It is made by melting fine clarified lard, seven pounds, in a porcelain vessel, by means of a salt-water bath, or a steam heat under fifteen pounds pressure; then run into it, *very slowly*, potassa ley, containing about twenty-six per cent. of caustic potassa, three pounds and twelve ounces, agitating continually from right to left during the whole time. When about half the ley is run in, the mixture begins to curdle; it will, however, finally become so firm and compact that it can not be stirred, if the operation is successful. The soap is now finished, but is not pearly; it will, however, assume that appearance by long trituration in a mortar, gradually adding rectified spirit two ounces, in which has been dissolved, essential oil of almonds two drachms.

Properties and Uses.—Triturated with water, *Sweet almonds* produce a white mixture called *emulsion* or *milk of almonds*, which possesses a very remarkable analogy with animal milk; it contains a great quantity of oil, kept in suspension in water by the presence of sugar, gum, and albumen, and is used as a demulcent, and as a vehicle for other medicines. The oil, in small quantity, acts as a demulcent; in larger doses it is laxative. It is frequently employed in cough, diseases attended with intestinal irritation, and for mitigating the acrimony of the urine in calculous affections, cystitis, gonorrhea, etc. Externally, the oil is sometimes used in lotions and cosmetics. Dose of the oil, one to two fluidrachms. *Bitter almonds* are sedative, and in large doses poisonous. The Oil of Bitter almonds, or bitter almond water, is commonly employed, and may be used as a substitute for hydrocyanic acid. Dose of the oil, one quarter of a drop to one drop, in emulsion, and cautiously increased. Seldom used.

Off. Prep.—Aqua Amygdalæ Amara; Mistura Copaibæ Composita; Oleum Amygdalæ.

AMYGDALUS PERSICA.

Peach.

Nat. Ord.—Rosaceæ. Drupaceæ, *De Candolle.* *Sex. Syst.*—Icosandria Monogynia.

LEAVES AND KERNELS.

Description.—Amygdalus Persica, or Peach-tree, is well known by almost every person. It is commonly considered to be a native of Persia. The *leaves* are lanceolate, serrate, with all the serratures acute; *flowers* solitary, subsessile, appearing before the leaves, rose-color, with the odor of hydrocyanic acid; *drupe* fleshy, tomentose, yellowish, tinged with purple; *calyx* five-cleft, tubular, deciduous; *petals* five; *nucleus* somewhat compressed ovate, acute, rugosely furrowed, and perforated on the surface.—*W.*

History.—The peach-tree is cultivated in all parts of the United States, where its fruit reaches a greater degree of completion and excellence than in any other country. Its height is from eight to fifteen feet, its fruit is large, being from one to three inches in diameter, juicy, containing sugar, malic acid, etc., and of a delicious flavor. The leaves are from three to five inches long, about one-third as wide, smooth, green, petioles short, with one or two glands. There are about two hundred varieties of this fruit, of which, probably, one-third are *clingstones*, the flesh adhering to the stone, and the remainder *freestones* or *clearstones*, the flesh free, or separating from the stone. The kernels somewhat resemble bitter almonds, but are smaller, and, probably, possess similar medicinal virtues. Hydrocyanic acid can be obtained from most all parts of the tree. Gmelin procured a yellow volatile oil by distillation of the leaves, which was heavier than water, and contained hydrocyanic acid.—*Ed.*—*P.*

Properties and Uses.—Peach leaves in infusion have been recommended in morbid irritability of the bladder and urethra, pertussis, ischuria, hematuria, and nausea, as well as in all inflammations of the stomach and abdomen. They act as a sedative in doses of a tablespoonful every hour or two, of the cold infusion; in larger doses they slightly act upon the bowels, and are said to have been useful in removing worms. The kernels are similarly employed in the form of tincture, infusion, or syrup; four ounces of the kernels to a quart of brandy is asserted to form a powerful tonic in intermittent fever, and to be remarkably efficacious in curing leucorrhea; dose, a teaspoonful three or four times a day. Both leaves and kernels are said to contain hydrocyanic acid.

Off. Prep.—Infusum Persicæ.

AMYLUM.

Starch.

THE FECULA OF THE SEEDS OF TRITICUM VULGARE.

History.—Starch is one of the constituent products in various organs of many plants, especially in the seeds of the *Cerealia*, of which it forms between sixty and seventy-five per cent.; it is extracted from many of them for dietetic and medicinal purposes, under the several names of Starch, Arrow-root, Tapioca, Tous-les-mois, and Sago. It abounds especially in the different kinds of grain, among which wheat yields one of its purest varieties, and from which an average of about from fifty to sixty per cent. is to be had. In preparing starch from wheat flour, the flour, which consists of starch, gluten, mucilage, albumen, several salts, and some bran, is kneaded in a cloth with successive portions of cold water. The gluten and bran remain in the cloth; the mucilage, albumen, and salts dissolve in the water; and the starch passing away with the water in a state of suspension, gradually falls to the bottom. By allowing the albumino-mucilaginous water, from which it has subsided, to undergo fermentation, the starch is thereby purified from the gluten; for the acetic acid formed during this process dissolves the gluten.

Starch occurs in the form of white granules of varied size and form; These granules are definitely organized structures, although their existence in relation to that of the cell is transitory. They consist of assimilated food, deposited in a definite form, insoluble in the ordinary cell-sap of the plants containing them, through a process of organization analogous to that by which the development of the cell itself is effected. When these minute granules acquire appreciable dimensions, concentric lines may be observed, more or less distinctly in different cases; which lines increase in number with the increase of size, in many cases, however, soon becoming excentrical, from the preponderating growth of one side of the granule. In freshly extracted granules, the original center mostly appears solid or with a minute black point; but if the Starch is dry, the center appears hollow, sometimes is even occupied by air, and some starch-grains have a large cavity. If strong alcohol be applied to fresh grains, the abstraction of water likewise produces a hollow in the central point of growth, and in all these cases, cracks not unfrequently run out toward the surface. The lines seen in the Starch granules are the boundaries of concentric superimposed layers of its substance; sometimes these are very distinct, sometimes very faint; often, more distinct lines appear at intervals in the series of the same granule, and in these cases even, a thin vacancy, or in the dried granules a stratum of air seems to exist between the layers.

Starch, as met with in commerce, is of a granular and crystalline appearance, friable, insipid, inodorous, permanent in dry air, and in the form of irregular, quadrangular or hexagonal columns, emitting a peculiar sound when compressed. In a damp atmosphere it absorbs about twenty-four per cent. of water, without losing its dry appearance; a moderate heat removes its moisture. In its ordinary state it contains about twelve per cent. of moisture. It is insoluble in cold water, alcohol, and ether.—*E. and V.* Warm water at about 190° F., converts it into a kind of mucilage which, when sufficiently concentrated forms on cooling a jelly, *hydrate of starch.* When long boiled, the granule almost wholly dissolves, and the decoction on cooling does not gelatinize. Alcohol removes from it a trace of essential oil, on which its odor and taste, when any is present, depend. Diluted sulphuric acid resolves it into sugar; nitric acid into malic and oxalic acids. When Starch has been triturated or agitated with water, a dark purple compound is formed with iodine; a starch solution made with hot water and subsequently cooled, yields on the addition of iodine an immediate deep blue precipitate of iodide of starch. Pure Starch is colored blue by iodine, whether in its natural state or softened by hot water, the depth of the color depending on the quantity of iodine. Where much is added the color is almost black. When dilute sulphuric acid has been added previously, the color is rather purple than blue, especially the faint tinge given at first by weak solution of iodine. When the starch-grains are heated dry, the color given by iodine changes proportionately to the violence of the action from blue to purple, red wine color, and finally brown. The best application is the solution of iodine in iodide of potassium, and this should be used very weak in the investigation of starch. If iodine be almost a million times diluted, it can be detected by starch. Iodide of starch, in solution, heated to nearly the boiling point, loses its blue color, which returns as it cools; alkalies also remove the blue color; boiling it effectually removes the color. Starch is dissolved by alkalies, from which it is again precipitated by acids, di-acetate of lead, infusion of galls, lime, and baryta. Heated, starch melts, turns black, and is decomposed. Torrefaction renders it soluble in water, and changes it into a soluble gum-like body, known as *British gum* or *dextrine*, whose solution in water forms a very tenacious paste. The specific gravity of starch is 1.53 ; its composition $C_{12}H_{10}O_{10}$. According to Pereira, wheat starch examined under the microscope consists of large and small grains, the large ones being rounded and flattened, or lenticular, the small ones rather spheroidal. In the middle of the flattened surface is the rounded, elongated, or slit *hilum*, surrounded by concentric rings, which frequently extend to the edge of the grains. When heated the particles crack at the edges. The grains vary in size from .0001 to .0009 of an English inch. These granules have each a thin exterior pellicle or tegument, insoluble in water, and an interior soluble substance. *Amylin* is the name applied to the external integument; it is insoluble in water, is slightly yellow, and pulverizable. *Amidin* is the internal or soluble part of starch, it is yellow when anhydrous, white when it contains water, is tasteless and odorless, is transparent in thin plates, friable, melts and swells when heated, is soluble in water, but not in alcohol or ether. According to M. Biot it rotates a ray of polarized light to the right, about three times more so than common sugar. Dextrin is amidin rendered impure with variable proportions of starch-sugar and starch-gum, and may be prepared by boiling the starch for a long time in dilute sulphuric, muriatic, or oxalic acid; and if the boiling be still further continued, a saccharine substance is produced, similar to the sugar of grapes. *Diastase* is a substance into which the protein matter of barley and other grains is converted, after these have been made to germinate, and then their vitality destroyed by drying; one part of diastase can convert 2000 parts of Starch into dextrine and a little sugar.

Properties and Uses.—As a constituent of many vegetable substances, Starch forms a most important alimentary substance ; in a medical point of view, it is to be considered as a demulcent. The powder of Starch is used to take up acrid secretions from the external surface, to soothe the pain in erysipelas, and to prevent intertrigo in children ; in these affections it is usually dusted on the parts. It is also used in mucilage, or in emulsion for suspending drugs, when to be given internally, or by injection. Starch is sometimes triturated with the more active medicines, in order to render them more bulky and easily taken.

ANACYCLUS PYRETHRUM.

Pellitory of Spain.

Nat. Ord.—Compositæ (*De Candolle*) Asteraceæ (*Lindley*). *Sex. Syst.*—Syngenesia Superflua.

ROOT.

Description.—This is the *Anthemis Pyrethrum* of Willdenow, the name of which has been changed by De Candolle, and the plant placed into a new genus on account of a difference in the structure of its seeds. Its *stems* are numerous, procumbent, somewhat branched, pubescent. *Radical leaves* spreading, petiolated, smoothish, pinnately divided; the segments much cleft into linear, subulate lobes; *cauline leaves* sessile. *Branches* one-headed. *Receptacle* convex, with oblong-obovate, obtuse paleæ; *ray*, sterile, ligulate, white; *of the disk*, fertile, with five callous teeth, yellow.—*L.*

History.—Pellitory of Spain, or Spanish Chamomile, inhabits Barbary, Arabia, Syria, etc. The officinal part is the root, which as found in the shops, is about four inches in length and half an inch or less thick, externally grayish or fawn-colored, studded with black, shining spots, internally whitish, resinous-like, and presenting a radiated structure. It is inodorous, and when chewed produces a peculiar sense of pricking in the lips and tongue, and a glow of heat, with an increase of the salivary discharge. In 1835, Koene found it to contain a brown acrid resin, insoluble in caustic potassa; an acrid brown fixed oil, soluble in caustic potassa; a yellow acrid oil soluble in potassa; a trace of tannic acid; gum, inulin, various salts, and lignin.—*T.* Alcohol or ether dissolves its active principle.

Properties and Uses.—It is an energetic local irritant; and acts as a rubefacient when applied externally. Its tincture relieves toothache. The root chewed has been found useful in some rheumatic and neuralgic affections of the head and face, and in palsy of the tongue. The decoction has been used as a gargle in relaxation of the uvula. The dose is from thirty to sixty grains as a masticatory.—*P.*—*E. & V.*

ANAGALLIS ARVENSIS.

Red Chickweed.

Nat. Ord.—Primulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—Anagallis Arvensis is a beautiful annual trailing plant, growing in fields, roadsides, etc., introduced into this country from Europe. Its *stem* grows from six to twenty inches long, with elongated branches, or simple, often dotted with purple, square, and more or less procumbent. The *leaves* are sessile, ovate, many-ribbed, opposite or ternate, dotted with purple at the back; *peduncles* longer than the leaves; *sepals* linear-lanceolate, about equaling the petals; *petals* obovate, obtuse, longer than the stamens, crenate-glandular. *Flowers* opposite, small but beautiful, with scarlet petals, opening at 8 o'clock, A. M., and closing at 2, P. M.; in damp weather not open at all. *Stamens* purple, hairy, dilated, and smooth at the base. *Anthers* yellow, heart-shaped. *Style* purple, permanent. *Stigma* capitate. *Capsule* pale and transparent, the size of a pea, separating all round, the valves marked with some indications of longitudinal separations which seldom take effect. *Seeds* roughish, abrupt externally, each with a central dot.—*L.*—*W.*

History.—This plant has several names, as *Red Pimpernel*, *Poor Man's Weather Glass*, *Scarlet Pimpernel*, etc. It blossoms from May to August. The leaves are the parts used; they are odorless, but have a rough, unsavory taste. Water extracts their virtues. The plant appears to possess energetic properties, for according to Lindley, Orfila killed a dog by "making him swallow three drachms of the extract; upon examination it was found to have inflamed the mucous membrane of the stomach." Grenier obtained a similar result.

Properties and Uses.—These are not fully known. It was considered an antidote to poison many years ago, and has more recently been employed to prevent the evil results arising from the bite of a rabid animal. Its internal use has been advised in mania, epileptic attacks, dropsical affections, and other derangements of the nervous system, but it should be employed with caution. It may, however, be used in form of poultice, as a local application to old and ill-conditioned ulcers.

ANAMIRTA COCCULUS.

Cocculus Indicus.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Diœcia Dodecandria.

THE FRUIT.

Description.—Anamirta Cocculus, formerly called according to Linnæus, *Menispermum Cocculus*, is a strong, climbing shrub, with a corky, ash-colored bark, with deep cracks or fissures; the *leaves* are dense, smooth, shining, coriaceous, roundish, acute, very slightly cordate, if at all, sometimes truncate at the base, with five digitate ribs, about six inches long, and as many broad; *stalks* a little shorter than the leaves, tumid at both ends, especially the lower. *Flowers* diœcious; *female flowers* in lateral compound racemes. *Calyx* of six sepals in a double series, with two closely-pressed bractioles. *Stamens* united into a central column dilated at the apex. *Anthers* numerous, covering the whole globose apex of the column. *Drupes*, one to three, globose, one-celled, one-seeded. *Seed* globose, deeply excavated at the hilum. *Albumen* fleshy. *Cotyledons* very thin, linear-oblong, distant, diverging, very membranous.—*L.*—*W.*—*A.*

History.—Cocculus Indicus inhabits Malabar, the Eastern Islands, etc., of India. The fruit, as met with in commerce, consists of a dry, light, roundish nut, nearly half an inch in diameter, of a grayish-black color, wrinkled, inodorous, subreniform, and composed of an external, slightly bitter, shell or layer, beneath which is a white, thin, ligneous endocarp, containing an oleaginous, whitish-yellow, odorless, but intensely bitter nucleus or seed, of a semi-lunar form, within which arises a central placenta, contracted at base, but enlarged and divided into two cells superiorly. According to Pelletier and Couerbe, the nucleus contains picrotoxin, resin, gum, fatty matter, odorous matter, malic acid, mucus, starch, lignin, wax, etc. The shell consists of menispermin, paramenispermin, yellow alkaline matter, hypopicrotoxic acid, wax, starch, chlorophylle, resin, gum, fat, etc.

Picrotoxin or *Picrotoxic acid* is the bitter and poisonous principle of Cocculus Indicus. To procure it, bruise the berries, separate the hulls by sifting, powder the inner part, warm it in a copper or iron vessel, and strongly press it to remove the fatty matter they contain. Again bruise the residue, digest it in a vessel for one day with three times its weight of alcohol, then press, and treat the residue twice again with the same quantity of fresh alcohol, which takes up the whole of the picrotoxin, the coloring matter, and some fat. To the alcoholic tincture add one-sixth its volume of water, distill off the alcohol, pour the residue into a copper vessel, add a moderate quantity of wood charcoal, and evaporate to dryness with a gentle heat. Finely powder the dried mass, and digest it with ether three times, in a closed bottle at the ordinary temperature, which dissolves the picrotoxin and a little fat. To the ethereal tincture add one-sixth its weight of water, distill off the ether, and then gently warm the residue in a porcelain dish until the smell of ether has entirely disappeared, and then allowed to cool. The fatty substance which solidifies and floats on the surface of the water is separated by filtration, the fat washed with alcohol of 60 p. ct., and the filtrate evaporated to crystallization. After the ·picrotoxin has crystallized, press it between filtering paper to remove the last trace of fat, and again dissolve it in three times its weight of alcohol of 80 p. ct., and allow it to crystallize. Eight pounds of berries will yield an ounce or an ounce and a half. Picrotoxin forms white, crystalline crusts, or brilliant needles, of an insupportably bitter taste, but odorless. It is permanent in the air, fuses when heated, giving off volatile products having an acid reaction, a carbonaceous residue being left, which must be entirely combustible in the air. It dissolves in 150 parts of cold water; in 25 of boiling; in 10 parts of cold alcohol; in its own weight of boiling alcohol of 80 p. ct.; and in $2\frac{1}{2}$ parts of ether; the solutions have no action on vegetable color. It is readily taken up by caustic alkalies. Its formula is $C_{12}\ H_7\ O_5$.—*Witt.*

Properties and Uses.—This article is never given internally, on account of its poisonous properties. Given to animals it acts on the cerebro-spinal system, causing giddiness, staggering, tetanic convulsions and coma. It also produces gastric irritation. It is never used internally, but the powder, or an ointment has been applied in barbers' itch, scald-head, itch, and other unyielding diseases of the skin, as well as to kill lice. Given to fish, it poisons them, depriving them of sensibility, and has been used for the purpose of catching them. Brewers sometimes add it to their beer, etc., to give a due degree of bitterness without the employment of hops, as well as to render them more intoxicating, but which is highly improper and dangerous.

ANDIRA INERMIS.

Cabbage-tree Bark.

Nat Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE BARK.

Description.—Andira Inermis (*Geoffroya Inermis*), is a tree of moderate height; the *branches* suberect at their extremities, terete, glabrous, ash-colored. The *leaves* are alternate, about a foot in length, unequally pinnate; leaflets five to eight paired, on short, roundish, ferruginous, downy stalks, oblong-lanceolate, rarely ovate-lanceolate, acuminate, for the most part rounded at the base; entire, glabrous, thin, with the nerves scarcely prominent, about 4½ inches long, and one inch broad; *petioles* minutely downy. *Stipules* lanceolate, persistent. *Panicles* terminal and axillary, erect; *branches* subdivided, spreading, angular, brownish purple, covered with ferruginous down; *pedicels* very short, one-flowered, numerous, crowded. *Flowers* reddish-lilac. *Calyx* turbinate-campanulate, covered with ferruginous down. *Standard* and *wings* unguiculate; *keel* composed of two petals, smaller than the standard. *Ovary* stipitate, containing three ovules; *style* subulate, curved; *stigma* simple. *Legume* size of a large plum.—*L.*

History.—This tree inhabits the West Indies; the bark, as met with in commerce, is in pieces of various sizes, which are thick, grayish-brown externally, covered with scales and eroded by lichens; yellow interiorly; furrowed; of a resinous fracture, nauseous odor, mucilaginous and sweetish taste, and pulverulent, the powder resembling that of jalap.—*Ed.*—*E. & V.* It contains a crystalline, neutral, azotiferous, bitter, and purgative principle, which has been absurdly named *Jamaicina*. It is brownish-yellow, soluble in water and alcohol, and gives a yellow precipitate with tincture of nut-galls.

"The Surinam bark, *A. Retusa*, has a grayish epidermis, covered with lichens; bark brown, lamellated, very tough, compact; when cut across, brilliant and variegated brown; when recent nauseous; no smell when dried; taste a little acrid and bitter; powder pale-cinnamon." Huttenschmidt found a white crystalline substance in it.

Properties and Uses.—Cabbage-tree Bark is emetic, purgative, and anthelmintic. It is thought by some to be a dangerous acro-narcotic in large doses, causing troublesome sickness, fever and delirium; on which account it is not much used in practice, although it has proved effectual in removing the lumbricoid worms. The bark in powder may be given in doses of from ten to thirty grains; of the decoction, a tablespoonful two, three, or four times a day. Any unpleasant symptoms resulting from its administration may be obviated by a dose of castor oil, and a free use of lemon-juice or lime-juice.

ANDROMEDA ARBOREA.

Sorrel Tree.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—Andromeda Arborea is a tree growing from forty to fifty feet high, with a trunk from ten to fifteen inches in diameter. The *leaves* are oblong-lanceolate, acuminate, serrate, petiolate, deciduous, from five to six inches long, and from one to two inches broad, villous when young, at length smooth, with a distinctly acid taste, and early in autumn they turn bright scarlet. The *flowers* are pedicellate, secund, spreading, at length reflexed; *panicles* terminal, consisting of numerous spicate racemes. *Calyx* without bractlets. *Corolla* ovate-oblong, narrowed at the summit, five-toothed, pubescent externally. *Filaments* thickened; *anthers* awnless, the cells long and pointed; *capsule* pyramidal, pentangular; *seeds* ascending from the base, linear, with a loose coat, taper-pointed at both ends; *bracts* and *bractlets* minute, deciduous.— *W.*—*G.*

History.—This elegant tree inhabits rich woods from New York to the Gulf of Mexico, and in the Alleghany valleys, and bears white flowers in July. The leaves are the parts used, they have an agreeable tartness, and yield their properties to water.

Properties and Uses.—Sorrel-Tree leaves are tonic, refrigerant and diuretic. Fever patients will find a decoction of the leaves, a pleasant, cooling and diuretic drink. Some species of the Andromeda are poisonous, as the *A. Ovalifolia*, *A. Polifolia*, *A. Mariana*, *A. Nitida*, and *A. Angustifolia*. The blossoms and leaves of the *A. Pulverulenta* and *A. Speciosa*, have a pulverulent substance upon their surface, which is reputed a strong sternutatory.

ANEMONE NEMOROSA.

Wood Anemone.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE PLANT.

Description.—Anemone Nemorosa, sometimes called *Windflower*, is a delicate and pretty plant, with a creeping root, and a simple, erect stem, with a single flower on a naked peduncle, and from six to nine inches high. The *leaves* are radical and ternate, and the *leaflets* undivided, or with the middle one three-cleft, and lateral ones two-parted, incisely dentate; *involucre* at the base of the flower-stalks, long-petioled, divided into three, toothed and cut; *sepals* four to six, oval, white, sometimes tinged with purple outside; *carpels* fifteen to twenty, ovate, with a short style, hooked. *Stamens* numerous, much shorter than the sepals; *ovaries* numerous, free, collected into a roundish or oval head.—*G.*—*W.*

History.—This plant is common to Europe and the United States, bearing purplish-white flowers in April and May. There are several varieties of it, which possess similar properties, as the *A. Patens*, of this country, the *A. Pratensis* and *A. Pulsatilla*, or Meadow Anemone of Europe. The last is probably the most active among them. The herbaceous part of the plant is employed in medicine. A volatile, crystallizable solid, called *Anemonine* is obtained from the various species of anemone, by distilling the plants with water, and setting the product aside; it crystallizes in brilliant white needles. Its formula is $C_2 H_2 O_2$. Alkalies convert it into Anemonic acid. A solution of it has been used externally in scaldhead, ulcers, caries, indurated glands, venereal nodes, serpiginous affections, paralysis, amaurosis, cataract, and opaque cornea. Its internal use is questionable.

Properties and Uses.—These plants are acrid and poisonous. They have been recommended in amaurosis and other diseases of the eye, secondary syphilis, cutaneous diseases, and hooping-cough, in doses of one or two grains daily. When applied locally, they are said to be efficient in scaldhead. In the recent state, the leaves bruised and applied to the skin are rubefacient. In large doses, this article produces nausea, vomiting, looseness of the bowels, and hematuria. It is very seldom applied in practice, except among the Homeopaths, who use the *A. Pulsatilla.*

ANEMONE CYLINDRICA, of Gray, is used by the Indians for the cure of a rattlesnake bite. Their mode of using it is, to chew some of the tops of the plant, swallowing but little of the saliva, and then applying it to the bite; in a few minutes the poison is rendered harmless. When chewed, the tops have a hot, pungent taste, somewhat like capsicum. All the Anemones are useful in menstrual suppression.

ANGELICA ATROPURPUREA.

Purple Angelica.

Nat. Ord.—Umbelliferæ or Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT, HERB AND SEED.

Description.—Angelica Atropurpurea, also known as *Masterwort*, *High Angelica*, etc., has a root of a purple color, and a smooth, dark-purple, furrowed, hollow, glaucous *stem*, five or six feet high, and one or two inches in diameter. The *leaves* are ternately divided; *petioles* large, much inflated, channeled on the upper side. The *leaflets* are pinnate, five to seven, sharply cut-serrate, acute, pale beneath, the terminal one sometimes three-lobed, the lateral ones of the upper division decurrent. *Umbels* three, large, terminal, many-rayed, spreading, spherical, six to eight inches in diameter, without the involucre. *Umbellets* dense, subhemispheric, on angular stalks, and with involucels of subulate bracts longer than the rays. *Calyx* five-toothed; *petals* equal, entire, with the point inflected. *Involucels* short, about eight-leaved. *Fruit* smooth, compressed, somewhat solid and corticate, elliptic.—*G.*—*W.*—*Nut.*

History.—This perennial plant grows in fields and damp places, developing greenish-white flowers from May to August. The plant has a powerful, peculiar, and not disagreeable odor, and a sweet taste, succeeded by considerable pungency and spiciness; much of these properties is lost by desiccation. They are due to a volatile oil, acrid soft resin, etc. The fresh root is reputed to act as a poison.

Properties and Uses.—Aromatic, stimulant, carminative, diaphoretic, expectorant, diuretic, and emmenagogue. Used in flatulent colic and heartburn. It is said to promote the menstrual discharge. In diseases of the urinary organs, calculi and passive dropsy, it is used as a diuretic, in decoction with *Uva ursi* and *Eupatoreum purpureum.* Dose of the powder, thirty to sixty grains; of the decoction, two to four ounces, three or four times a day. The *Angelica Archangelica, A. Triquinati* and *A. Lucida,* may be substituted for the above.

ANTENNARIA MARGARITACEUM.

Pearl-Flowered Life-Everlasting.

Nat. Ord.—Compositæ or Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES.

Description.—Antennaria Margaritaceum is a perennial plant, with a simple, erect stem, corymbosely branched above; the *leaves* are linear-lanceolate, acute, three-veined, sessile, and beneath the stem woolly; *corymbs* many-flowered, fastigiate; *scales* of the *hemispheric involucre* elliptic, obtuse, opaque, pearl-white, the outer ones only tomentose at the base. *Heads* diœcious; the *pistillate flowers* very slender; pappus simple, bristly, capillary in the fertile flowers, and in the *sterile* club-shaped or barbellate at the summit. *Corolla* yellowish.—*W.*—*G.*

History.—The name *Antennaria* is from the resemblance of the sterile pappus to the *antennœ* of many insects—*W.* The plant is slightly fragrant, and grows in dry hills and woods in various parts of the United States; it is from one to two feet in hight, and bears yellow and white flowers in July. The leaves are the parts used.

Properties and Uses.—Anodyne, astringent and pectoral. A decoction has proved beneficial in diarrhea and dysentery, and in pulmonary affections. Externally, it forms an excellent poultice in sprains, bruises, boils, painful swellings, etc., and is said to produce sleep when applied externally to the head, even in cases where a poultice of hops has failed. The

A Plantagineum, and *A. Dioicum*, or White Plantain, are reputed efficacious in bites of poisonous reptiles.

ANTHEMIS NOBILIS.

Chamomile. Roman Chamomile.

Nat. Ord.—Compositæ Senecionideæ, or Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

FLOWERS.

Description.—This is a perennial herb, with a strong root, having long fibers. The *stems* in a wild state are prostrate, in gardens more upright, about a span long, branched, leafy, round, hollow, furrowed, downy. The *leaves* are pale-green, doubly pinnate, sessile, with small, thread-shaped *leaflets* which are rather flat or channeled above, convex beneath, somewhat downy, acute, and commonly tri-lobed. The *flower-heads* are terminal, solitary, rather larger than a daisy, with a convex yellow disk, and numerous white, spreading or reflexed rays.—*L.* *Involucre*, with small shining membranous bordered scales, rather downy. *Receptacle* obtusely conical, with minute chaffy scales, which do not appear till the disk florets are turned to one side, and the innermost are gradually narrowest.— *W.* *Ray florets* eighteen, white, strap-shaped, tridentate; *Disk florets* yellow, many, tubular, in five segments. *Stamens* five; *ovary* obovate; *style*, slender; *stigma* reflexed, two-cleft; *seeds* flat, ovate.

History.—Chamomile is indigenous to Southern Europe, where it is cultivated for the purposes of medicine; there are two varieties, the single and the double, of which the former is the best, the latter being commonly the result of cultivation. The white flowers are the best; they have an aromatic, agreeably bitter taste, a strong and peculiar odor, and yield by distillation a volatile oil of a pale blue color at first, but gradually becoming brownish or yellowish. Their aromatic and stimulant properties are due to this oil, and a resin; their tonic to bitter extractive and tannic acid. A fixed oil may be obtained from the seeds by expression. They yield their properties to water, or alcohol.

Properties and Uses.—In doses of from half a drachm to two drachms of the flowers, or from one to three fluidounces of their infusion, Chamomile is a tonic; from five to twelve fluidounces of a warm strong infusion usually vomits. The cold infusion has proved useful in dyspepsia, and in all cases of weak or irritable stomach; also in intermittent and typhus. The oil is carminative and antispasmodic. Used in flatulency, colic, cramp in the stomach, hysteria, nervous diseases, and in painful dysmenorrhea. Dose of the oil, five to fifteen drops, on sugar; of extract, prepared in vacuo, which is the best form for internal administration, one to three grains. The flowers of the *Matricaria Chamomilla*, or German Chamomile, possess similar properties to the Anthemis, but are rarely used in this country, except by German practitioners.

Off. Prep.—Extractum Anthemidis; Extractum Anthemidis Fluidum; Infusum Anthemidis; Oleum Anthemidis; Vinum Symphytii Compositum.

APOCYNUM ANDROSÆMIFOLIUM.

Bitter-root.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—Apocynum Androsæmifolium is a smooth, elegant, indigenous plant, with a large, perennial *root*, and a *stem* five or six feet high, smooth, simple below, branching repeatedly at top, red on the side exposed to the sun, milky. The *leaves* are dark green above, paler beneath, opposite, ovate, rounded at base and acute at the apex, petioled, downy underneath, sometimes two or three inches long, and nearly an inch wide. *Flowers* grow in nodding cymes from the ends of the branches and axils of the upper leaves, furnished with minute, acute bracts. *Corolla* white, tinged with red, monopetalous, campanulate, with five acute spreading segments. *Calyx* five-cleft, acute, much shorter than the corolla. *Stamens* five, with very short filaments, and long, sagittate, connivent anthers, cohering with the stigma about their middle, and often holding fast such insects as may thrust their proboscis between them. The *nectary* consists of five oblong glandular bodies, alternating with the stamens. *Ovaries* two, ovate, concealed by the anthers and supporting two thick, roundish, sessile stigmas. The *fruit* is in the form of a pair of slender, linear-lanceolate, drooping follicles, containing numerous oblong, imbricated seeds attached to a slender central torus, and each crowned with a long, downy pappus. Every part of the plant is lactescent.—*G.*—*L.*

History.—This plant, likewise called *Dogsbane*, *Milk-weed*, etc., is found growing in dry sandy soils, and in the borders of woods from Maine to Florida, flowering from May to August; when any part of it is wounded, a milky juice exudes. The large, milky root is the officinal portion, or rather its bark, which forms the greater part of it; it possesses an unpleasant amarous taste. It yields its properties to alcohol, but especially to water. Age impairs its virtues. There has been no minute analysis of the root, though Zollickoffer states that it contains resin, caoutchouc, and mucus. Bigelow supposed it to contain volatile oil, coloring matter, extractive, etc. When given with capsicum or opium, its emetic action is checked, and with the latter drug diaphoresis is produced.

Properties and Uses.—Emetic, diaphoretic, tonic, and laxative; it has been found very valuable in the treatment of chronic hepatic affections, and in conjunction with *Menispermum* in dyspepsia and amenorrhea. When it is required to promptly empty the stomach, without causing much nausea, or a relaxed condition of the muscular system, the powdered root may be given in two or three scruple doses. However, it is said to occasion a subsequent weakness or languor, from which the patient is some time in recovering. As a laxative, it is useful in cases of constipation, and in hepatic derangements. As a tonic, ten or twenty grains may be given to stimulate the digestive apparatus, and thus effect a corresponding impression on the general system. As a diaphoretic it must be combined with opium, in the proportion of one grain of the latter to forty of the former, and divided into three or four doses; however, as a diaphoretic, it is inferior. Also reputed useful as an alterative in rheumatism, scrofula, and syphilis. Prof. Gregory speaks of Apocynine as the active agent of the Androsæmifolium, but has given no method of preparing it. It is said to be very bitter, and of a dark orange color. Used as an alterative in syphilitic and scrofulous affections, in doses of half a grain to a grain; as a purgative, one grain to two grains. It has been beneficially employed in liver and stomach affections, intermittents, and the low stage of typhoid fevers.

I have used a preparation called *Apocynin*, prepared from this plant by Mr. J. B. Robinson, formerly of Cincinnati, Ohio, in jaundice, combined with leptandrin and myricin, with excellent effect, as well as in hepatic torpor, and constipation. It is a powder of a dark-brown color, possessing an odor similar to the root, and a bitter, nauseous, unpleasant taste. Mr. Robinson prepares it by treating the saturated tincture of the root with Ammonia, then filtering and precipitating the Apocynin by Sulphuric Acid, which must be added gradually; when obtained it is to be washed in one or two waters, and then dried. One pound of the root yields about half an ounce of the dried Apocynin, and much care must be taken in the operation, lest the whole be spoiled.

Off. Prep.—Decoctum Apocyni; Extractum Apocyni Hydro-Alcoholicum; Apocynin.

APOCYNUM CANNABINUM.

Indian Hemp.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—This plant is perennial, and very much resembles the A. Andros., so much so as to have been confounded with it. The *root* is creeping; the *stems* are three or four feet high, straight, generally dividing above into long, slender branches. The *leaves* are oblong, mucronate, between two and three inches long, about three-quarters of an inch broad, opposite, on short petioles, and when young downy beneath. The *cymes* have numerous flowers in panicles, are terminal and lateral, with linear bracts. The *flowers* are about half as long as those of the preceding species. *Sepals* lanceolate, acute. *Corolla* greenish-white, with straight, obtuse segments; tube campanulate; calyx with lanceolate divisions, as long as the corolla tube. *Follicles* three to five inches long, slender, pendulous.—*W.*

History.—This plant is indigenous, inhabiting the same locations, and blossoming in the same months as the preceding species. It is replete with a lactescent juice, which becomes hard, like opium, under exposure to the air. The bark of the stem, when dry, from its fibrous, cohesive nature, is a superior article in the manufacture of rope, giving a white, strong, and durable production. A permanent brown or black dye, according to the mordant use, is obtained from a decoction of the plant. The root is the part used; it consists of a brown cortex, rough externally, white and smooth on its inner surface, of a disagreeable odor, and an extremely bitter and sickening taste. The internal woody part of the root is light yellow, with some odor and bitterness. The dried root-bark is very pulverable. Dr. Griscom, who analyzed the root in 1832, found it to contain tannic and gallic acids, gum, resin, wax, fecula, *apocynin*, coloring matter, woody fiber, and, probably caoutchouc. Water readily takes up the active properties of the root, which are also partially soluble in alcohol; its virtues are impaired by age.

Properties and Uses.—Dr. Griscom states that this agent has four different and distinct operations upon the system, which it almost invariably produces, viz.: 1st, nausea or vomiting; 2d, this is followed by increased alvine discharges, which are succeeded, 3d, by copious perspiration, and in many instances, 4th, by diuresis. In a full dose it occasions considerable sickness at stomach, lessens the pulse, and produces an inclination to sleep, probably from some somniferous principle in it—copious vomiting soon ensues, and the other effects as above stated. Snuffed into the nostrils, the powder will excite sneezing. A strong decoction is exceedingly valuable in irritable and congested uterus, accompanied with nausea, vomiting, tympanitic abdomen, headache, and powerful pulsations of the abdominal aorta, in doses of a teaspoonful every one, two, or four hours. In some cases it may be advantageously combined with pleurisy root. As a hydragogue cathartic, and also as a diuretic in those instances where this effect is displayed, it has been found most useful in dropsy. In diaphoretic doses it has proved beneficial in intermittent and remittent fevers, and pneumonic affections. As an emetic, from twelve grains to half a drachm of the powdered root-bark, may be given; as a hydragogue or diuretic, the decoction is the best form in which to employ it,—one ounce of the root may be boiled in a pint of water, of which half a wineglassful, or even less, may be given three or four times a day. Smaller quantities of the decoction, given warm, will cause diaphoresis; as a purgative, the aqueous extract may be given in doses of from three to six grains. The *apocynin* obtained from this plant will probably be found identical in virtue and chemical constitution with that from the *A. Androsæmifolium.* Further investigations with it are required, before any thing positive and satisfactory can be made known.

AQUA.

Water.

History.—From the almost universal solvent ability of water, it is the most extensive pharmaceutical agent that we possess, beside being, when properly employed, a most valuable remedy for a large number of diseases. The purest water that can be obtained is *distilled water*, which when properly prepared in clean glass vessels, is colorless, transparent, scarcely compressible, tasteless and inodorous, with the assumed specific gravity 1, being the standard to which the sp. gravities of liquids and solids are referred. It is the only admissible water for pharmaceutic and chemical tests, as the presence of organic or saline substances in it, may decompose the articles to be dissolved, or impair its solvent power. At a temperature of 32° F., or lower, it is converted into ice; boils at 212° F., and is converted into steam. Its crystallization into ice is accompanied with expansion, and the specific gravity of ice is 0.916; the volume of steam is about 1700 times more than that of water, and its specific gravity is 0.622. Water is perfectly neutral, exhibiting neither acid nor basic properties, though capable of combining with each, and increasing their activity, and the compounds thus formed are called *hydrates*. It likewise readily combines with many gaseous bodies, giving to them a fluid form. As a general rule, its solvent powers are increased by heat, especially in regard to solid bodies. It should always be kept in well-closed glass vessels. Pure water consists of one equivalent of Hydrogen 1, and one of Oxygen 8=9, and its formula is HO, being a *Protoxide of Hydrogen*. Water is never found naturally pure, and the only way to obtain it perfectly pure is to distill it. Although water differs in many respects, according to its locality, yet it is generally known as possessing three qualities, viz.: *Soft water*, *Hard water*, and *Mineral* or *Medicinal water*. For most ordinary purposes *soft waters* are preferred to the hard, and may be distinguished by the readiness with which they dissolve soap, notwithstanding they may contain considerable foreign matters. *Hard waters*, on the contrary, holding in solution salts of lime or other earths, do not dissolve soap, but coagulate and decompose it, rendering it insoluble; these are unfit for internal use or ordinary household and pharmaceutical purposes. The hardness of water is tested by a tincture of soap made by dissolving one drachm of curd soap in a pint of proof-spirit (Imperial measure). It has no action on distilled water; renders soft water slightly milky and semi-transparent; and gives to hard water a white opaque aspect. Good common water is limpid, inodorous, dissolves soap, and is not affected by either nitrate of silver, nitrate of baryta, or oxalate of ammonia. Water is distinguished into several varieties, as follows:

1. *Rain water*, *Aqua pluvia*, and *Snow water*, *Aqua nivalis*, when collected so as to prevent accidental impurities, are the purest waters to be had naturally. They are generally impregnated with the soluble matters

in the atmosphere, which varies in different locations, the most common impurities being carbonic acid, carbonate of ammonia, chloride of sodium, organic and suspended mineral substances; during a thunder-storm traces of nitric acid and nitrates are said to be likewise present. In collecting rain water, the first that falls should be rejected; if from the tops of houses, two or three hours of a continuous shower will wash off any objectionable impurities, and the water will run clear and transparent; if from an open space at a distance from dwellings, it may be permitted to fall an hour or so before attempting to collect it. To obtain it as pure as possible, it should be filtered, boiled, and again filtered. No water should ever be used which comes in contact with lead—for the lead becomes oxidized by the oxygen of the water, which oxide is reduced to a carbonate by the action of the carbonic acid derived from the air, and the water thus containing lead may produce the poisonous effects of that metal upon the system. The purer the water the greater the hazard.

Snow water is said to be richer in oxygen than other water, and is generally free from the atmospheric gaseous impurities found in rain water; it quenches thirst, while snow, not melted, augments it. The opinion at one time entertained that the use of snow water disposed to gôitre is undoubtedly an erroneous one, as the disease not only occurs where snow is never seen, but is unknown in many sections of mountainous countries where the water employed is chiefly that supplied by the melting of the snow which covers the mountains. Rain and snow waters, collected with a degree of care, are applicable to every domestic purpose, as well as to many chemical and pharmaceutical processes.

Spring water, *Aqua fontana*, is that which springs from the earth, free from large amounts of carbonic acid, or salts, and not possessing elevated temperatures; it is the general beverage of mankind, and is applicable to all domestic purposes. Its quality varies according to the nature of the soil in its vicinity; those springs arising from trap rocks, sandstones, transition, and primitive rocks are the purest; those from alluvial strata, limestone, and coal formations are the least pure. All, however, contain variable traces of the salts of lime, soda, or magnesia, according to the character of soil through which they flow.

Well water, *Aqua puteana*, very much resembles spring water in its qualities, its purity being somewhat governed by the depth at which it is procured, and its daily flow. The Artesian wells usually supply a very pure water. Nitrates have been found in the well water of cities, as might naturally be expected from the impurities of their soils.

River water, *Aqua fluvialis*, especially when passing through alluvial countries, and near great cities, contains suspended in it more or less earthy and vegeto-animal impurities, which lessen its clearness, but in a short time it becomes purified of these by deposition during its downward course. In countries where the rivers pass chiefly over primitive rocks, the waters are found to be almost perfectly pure. When moderately pure it is fit for all ordinary purposes, though if it contains much vegeto-animal matters, it is apt to occasion dysentery, and other affections of the bowels, and then becomes inadmissible in pharmacy. The Croton water of New York, the Schuylkill water of Philadelphia, and the Ohio river water, are, when filtered, sufficiently pure for all domestic purposes, and for pharmaceutical operations, in which distilled water is not expressly required. *Lake water*, *Aqua ex lacu*, resembles river water in its qualities.

Marsh water, *Aqua ex palude*, on account of its stagnation and repletion with putrescent matters is altogether unfit for domestic or therapeutical use. This water contains among other impurities animalcules, and microscopic vegetation; although these are met with in running and clear waters in which there is considerable vegetable growth. But they are absent in spring and well waters, and most of the river waters supplied for domestic purposes. There is no doubt but that the drinking of water containing shreds or filaments of cryptogamous plants, has occasioned sickness and even death. River and lake water should always be filtered, when used as beverage.

Prof. Faraday states, "that one grain of water will require for decomposition an electrical current equal to a very powerful flash of lightning." The chemical action of a grain of water upon four grains of zinc, can evolve electricity equal in quantity to that of a powerful thunder-storm; and he states, that from his experiments it would appear, that 800,000 such charges of the Leyden battery would be necessary to supply electricity sufficient to decompose a single grain of water. The Leyden battery of which he speaks, consists of fifteen jars, containing 3,510 square inches, or about twenty-four and a half square feet of coated glass, charged by thirty turns of a plate electrical machine, the plate being fifty inches in diameter, and of immense power, giving ten or twelve sparks an inch long for each revolution. In relation to this an author in the "Philosophical Magazine" remarks, that "the estimate that 800,000 discharges of the battery of fifteen jars, equal to a powerful flash of lightning, would be necessary to resolve a single grain of water into its elements, is certainly astounding, when it is recollected that, according to Prof. Faraday, the quantity of electricity that decomposes a body, is the equivalent quantity of electricity that had previously held the elements of that body in combination; for he, with Davy and others, conceives that electricity and chemical affinity are identical powers. Hence, in one grain, that is, one drop of water, there must be naturally existing, and constituting the affinity between its oxygen and hydrogen, no less a quantity of electricity, than 800,000 charges of a battery, containing 3,510 square inches of coated glass, or the equivalent of a very powerful flash of lightning. If this quantity of electricity were converted into one spark, it would be 4,166 miles in length, taking Prof. Faraday's mean estimate of one charge of his battery as the basis of calculation."

The usual impurities in water may be detected by the following means:

1. By boiling, air and *carbonic acid* are expelled, while carbonate of lime, when present, is deposited; the latter constitutes the fur or crust which lines tea-kettles or boilers. 2. If water contains *oxygen gas*, introduce the water, together with a crystal of the sulphate of protoxide of iron, into a vial, cork it well, and let it stand a few days, when there will be observed a yellowish-brown precipitate of sesquioxide of iron. 3. Blue litmus paper is reddened if acids be present; when the litmus paper is feebly reddened, it is restored to its original blue, if alkalies be present. 4. If *carbonic acid* be in the water, lime water causes a white precipitate of carbonate of lime, if employed before boiling the water. 5. *Sulphuric acid*, or *sulphates* cause a white precipitate, insoluble in nitric acid, when chloride of barium is added to the water, in solution. 6. *Lime* gives a white precipitate when a solution of oxalate of ammonia is added. 7. A solution of nitrate of silver causes a precipitate when *chlorine* or *chlorides* are present; if *organic matter* be present, the water becomes dark-colored by exposure to light; or, an ounce or two of water may be placed in a glass or porcelain vessel, to which may be added several drops of chloride of gold in solution, sufficient to render the water of a yellow tinge. If the water contains no undue amount of organic matter, boiling it will not affect the yellow tinge, but if this matter be present in too great a proportion, the fluid will assume a brown color, and then a violet or blue. Organic matter may also be detected by evaporating the water to dryness in a glass tube, and then igniting, when there will be a smoke, odor, and charring. Or, if the precipitate caused by adding nitrate of lead to the water, be collected and ignited, globules of metallic lead will be obtained. 8. *Magnesia* in water may be detected by first precipitating any lime present by boiling, and oxalate of ammonia, and then, after filtering, add aqua ammonia and a solution of phosphate of soda, when, in a few hours, there will be a white precipitate of the ammoniacal phosphate of magnesia. *Iron* may be detected by tincture of galls forming a black liquor, and ferrocyanuret of potassium a blue—or if the iron be in the form of a protosalt the precipitate will be white, but become blue by exposure to the air. If sulphureted hydrogen turns the water brown or black, it contains *lead* or copper.—*P.*

Mineral waters are those which present a large proportion of carbonic acid, with or without saline, alkaline, metallic, earthy and other foreign substances, and which exert an appreciable therapeutical influence on the animal economy. For all practical purposes, they may be appropriately divided into *acidulous*, *chalybeate or ferruginous*, *sulphurous*, and *saline mineral* waters. When the water is elevated in temperature the springs are called *Hot* or *Thermal;* when of ordinary temperature or lower, they are called *Cold Mineral Springs.*

Properties and Uses.—As a remedial agent, apart from its natural necessitous use, water internally is a tonic, diuretic, or sudorific, according to its mode of administration. Small quantities, taken cold, between

45° and 60°, and occasionally repeated, act as a tonic; in larger doses it produces diuresis, and diaphoresis, the latter effect more especially, if the patient be kept warmly covered; and it is extensively used for this purpose in many acute diseases. Warm water, of a temperature varying from 65° F. to 100°, and especially when taken in large quantities, will usually produce sickness and vomiting, and its continued daily use in small quantities will impair the tone of the stomach. Cold water, from 30° F. to 45°, is a grateful drink, more particularly to fever patients, allaying thirst, moderating the fever, often producing sleep and relief from restlessness; and is sufficient, unaided by other means, to effect a rapid solution of the disease, in many instances. It should never be withheld from patients laboring under febrile or inflammatory complaints, who crave it. During the operation of a vegetable emetic, cool water at 60°, is more agreeable, and fully as beneficial in assisting the emesis, as warm.

Externally, water is frequently applied as a sedative in local inflammations, as quinsies, sore-throats, ophthalmia, sprains and contusions, and as a means of restraining hemorrhage. Cloths wet with cold water and applied to the abdomen, have relieved severe pain in the bowels, retention of urine, etc. The cold dash or douche, has been successfully employed in delirium tremens, apoplexy, tetanus, hysteria, convulsions, obstinate constipation, congestive, bilious and typhoid fevers. The wet sheet is much used to allay febrile and inflammatory conditions, and to promote diaphoresis. As an injection it has been efficient in habitual constipation, and excessive tympanitic distension, as well as dysentery. Applied warm it is an excellent application to erysipelatous inflammations. Ice and iced water, as a local application, are said to be very useful in burns and scalds, also in many cerebral affections. The effects of water employed externally, depend upon its temperature. The *cold bath* acts according to its degree of cold, the manner in which it is used, and the peculiar state of the body at the time. When below 50° F., the bath is considered very cold. The primary effects of a cold bath constitute the *shock*,—its secondary effects the *glow* or reaction. The immediate effects of a cold bath are a sensation of cold, which gradually ceases, and is succeeded by numbness, the skin becomes pale, and covered with *cutis anserina*, there is shivering, with quick and irregular respiration, and a contraction of the cutaneous vessels, as well as of the volume of the body. If the immersion be continued, the pulse becomes slow and small, drowsiness and cramps come on, the heat of the body diminishes rapidly, and finally syncope and death. A cold bath is usually taken for its stimulating and tonic influence, and hence, should not be below 50°, nor above 75° F., and the immersion should be temporary. Reaction speedily follows, capillary circulation is re-established, a glow is felt, perspiration comes on, the pulse becomes full and frequent, and the whole system feels invigorated. Delicate or weakly persons should not take a cold bath. It is a common opinion that immersion in cold water is dangerous when the body is heated by exercise or other exertion; and hence it is customary with bathers to wait until they become cool. The first is an erroneous opinion; the second an injurious act.

Cold water may also be used by affusion, shower-bath, or douche, and will be found tonic, stimulant, or sedative, according to its temperature, the length of time it is used, and the state of the body.

The *warm bath* relaxes the system, lessens the activity of the circulatory and respiratory organs, diminishes the temperature of the body, and tends to tranquillize and occasion somnolency. It is useful in spasms and convulsions of children, retention of urine, nephritic pains, etc.; and in high inflammatory and febrile diseases, it will frequently prove advantageous. It should not be used in cerebral and pulmonary affections. The *vapor-bath* increases the action of the capillary vessels, causing excessive diaphoresis; it renders the skin pliable, relieves tension and rigidity of the joints, and may be usefully employed in rheumatism, cutaneous and several other affections. The *hot bath* is somewhat similar in its effects to the vapor, but is apt to prove dangerous in some constitutions.

The following are the temperatures at which baths are usually applied:

Water, cold	50° to 75° F.
do temperate	75 to 85 "
do tepid	85 to 92 "
do warm	92 to 98 "
do hot	98 to 112 "
Vapor, if breathed, tepid	90 to 100 "
do do warm	100 to 110 "
do do hot	110 to 130 "
do if not breathed, tepid	96 to 106 "
do do warm	106 to 120 "
do do hot	120 to 160 "
Hot air, as a sudorific	85 to 100 "
do as a stimulant	100 to 130 "

In addition to the above uses of water, it has likewise other employments, as follows:

THE WET-SHEET PACKING, or *Lien Tuch* of the Germans. A mattress of cotton, hair, or straw, has spread over it three or four large, thick comfortables, and over these one or two soft flannels. A linen sheet having been previously dipped in cold water, or for very delicate persons in tepid or even warm water, is lightly wrung out, so as not to drip, and spread over the whole, having under it one or two pillows for the head. The patient is made to lie upon these on his back, and is quickly and snugly enveloped in the wet sheet, over which is placed the flannels and blankets, or a light feather-bed may be thrown over the top, in case comfortables are not plenty. Care should always be taken to turn the clothing snugly and smoothly around the feet and neck; and if the feet remain cold, bottles of cold water should be placed to them. Headache is prevented or removed by the application of cold wet cloths applied to the head.

The time for remaining thus "packed," varies in different cases, averaging from half an hour to an hour, depending on the effect; the body should become comfortably warm before being removed. A disagreeable sensation of cold is first experienced, which is soon followed by a pleasurable warmth over the whole surface, and sometimes copious perspiration, though this last is not always indicated. On coming out of the "pack," the plunge, the douche, rubbing wet-sheet, or towel-washing are to be employed, as the case may require. If the patient experiences a chill after coming out, a thorough rubbing, followed by fifteen or twenty minutes' dry packing, will usually obviate all injurious consequences. The process of packing should never be continued so long as to cause headache, languor, muscular debility or giddiness.

This is said to act as a sedative, reducing the heat of the body, and excessive arterial action, and as an alterative, correcting morbid secretions and restoring healthy ones. In fevers, and all acute inflammatory disorders, it may be frequently renewed according to the degree of fever or inflammation, until the temperature and circulation are reduced to the natural standard, and the skin becomes soft and perspirable. Much sweating is not usually to be desired. In chronic diseases, it removes internal congestions, develops external circulation, produces a healthy condition of the skin, and may be used in many forms of this class of maladies. If carelessly attended to, the wet sheet may give rise to serious difficulties.

When the wet sheet is applied to the trunk of the body only, as in cases of feeble persons, where there is not sufficient vitality for the whole sheet, or for other purposes, it is termed the "HALF-PACK SHEET."

The DOUCHE (*doosh*) is the application of a stream of cold, tepid or warm water, from a greater or lesser height, and continued for a time indicated by its effects. The force of the stream, and time of application should be carefully adapted to the strength of the patient. Very nervous persons, and those subject to determinations to the brain, should resort to it with extreme caution. A strong douche should never be applied to the head, nor should it be long continued on any one spot along the vertebral column. A douche may be vertical, oblique, horizontal, or ascending. The most common are in perpendicular streams one or two inches in diameter. Its effect is to arouse the activity of the absorbent system, and is hence very useful in gout, rheumatism, paralysis, chronic enlargements of the viscera, tumors, etc.

The ascending douche will be found beneficial in piles, uterine displacements, prolapsus ani, constipation from debility, chronic enlargement of the prostate gland, impotency, etc. The stream may be half an inch to an inch, and should not be forcible enough to cause absolute pain nor serious inconvenience. Warm-water douches are for the purpose of producing relaxation of the muscles of the part acted upon, and are hence useful in rigidity of the muscles, painful swellings, chronic inflammation of the joints, neuralgia, spasmodic and bilious colic, retention of urine, amenorrhea, uterine rigidity, etc. In some cases it should be followed by a momentary cold dash.

The RUBBING WET-SHEET is a large sheet dipped in water, and wrung out so as not to drip. It is then suddenly thrown around the patient's body, enveloping him closely from the neck to the feet, and the body is then rubbed for about five minutes by the hands of the attendant on the outside of the sheet. It is to be followed by rubbing with dry towels. This produces a strong and general determination to the whole surface, and is applicable in all cases where a strong determination is desired from internal organs or surfaces to the skin. It will be found valuable in the early stages of bowel complaints, diarrhea, dysentery, colic, fevers, etc.; it is likewise useful for exhaustion following mental exertion, many forms of insanity, delirium tremens, nightsweats, wakefulness, nightmare, etc. When the sheet is employed drippingly wet (*the dripping sheet*) a large tub or pan is necessary for the patient to stand in, to avoid wetting the floor.

The HIP or SITZ-BATH is a common tub, in which the patient sits so as to have the water cover the hips and lower part of the abdomen. A vessel made for the purpose, with a back to rest against is more convenient. The water may be of any temperature, and the time of application varies from five to thirty minutes. According to its application it is tonic, derivative, or sedative. Tonic when applied from five to fifteen minutes; derivative when extended from fifteen to thirty minutes; and sedative according to its effects. Derivative hip-baths should not be carried to the point of producing paleness or lividity of the lips, shiverings, nausea, faintness, or headache, and according to the effect desired, and the coldness, torpor, and debility of the patient, indicate that the quantity of water should be lessened, or its temperature elevated. It is useful in debility, irregularity, obstruction, and torpor of the organs of the pelvis and lower part of the abdomen. A blanket is generally thrown around the patient during this bath.

The SHALLOW-BATH is a circular, or oval tub, raised about twelve inches from the floor, and with water in it from four to six inches deep. The patient sits in this, while the attendant sprinkles his head and rubs his chest, abdomen, and back. It may be employed from one to thirty minutes, and should be followed by a good dry rubbing. It is used at a temperature from 60° to 75°, and is excellent in cutaneous affections, and other cases where a mild derivative, or moderately sedative influence is desired.

The PLUNGE-BATH may be any vessel or place, the water being from 55° to 65°, which will allow the patient to plunge into it, head, or feet foremost as he fancies, or to quickly immerse the whole body up to the neck. The time for remaining in it, varies from a few seconds to two or three minutes, or in high fever, to ten or fifteen minutes. It is generally taken after the sweating process, and after the wet sheet, when the patient can bear the exertion; in these cases the sheet is not to be removed until at the plunge. It is very useful in all febrile and chronic affections, but should be employed with care, or avoided altogether in consumptive, and dropsical patients, and those laboring under organic diseases of the heart.

These are the principal applications of water in Hydropathic practice; yet there are several others of a useful character, as the *Foot-Bath*, the *Head-Bath*, the *Shower-Bath*, the *Vapor-Bath*, etc., the modes of application of which are generally well understood, as well as their effects. Cold water may likewise be used in form of a *bandage* or *girdle*, by applying one or more folds of linen wet in cold water, to the part affected, or around the abdomen, and covering it with a dry cloth or other material to retain the heat. The *wet girdle* or *abdominal wrapper* or *compress*, is applied around the abdomen in all acute diseases of the abdominal viscera. The *bandages* are applied warm or *cold*, according to the indications they are intended to fulfill.

Mineral waters vary in their effects upon the system, according to their constituent combination. The *acidulous* waters are powerful and diffusive stimulants of the nervous and circulatory systems, likewise diuretic. Generally useful in dyspepsia, passive dropsy, chronic diseases, chlorosis, and phosphatic gravel; contra-indicated in recent palsy, apoplexy, and active hemorrhages and inflammations.

Alkaline waters are antacid, antilithic, and diuretic. Useful in gout, gravel and stone. *Purgative* waters also possess diuretic properties, and are useful in all cases where laxatives are required. *Chalybeate* waters are tonic, and used in dyspepsia, all kinds of chronic cachexies, gout, and chronic diseases generally. *Sulphurous* waters are stimulant, diaphoretic, diuretic and emmenagogue, and are found beneficial in chlorosis, rheumatism, dysmenorrhea, secondary syphilis, chronic cutaneous diseases, and deranged conditions of the stomach and liver. They are contra-indicated in plethora, determination to the head, and active hemorrhages and inflammations. Waters which contain iodine or bromine, have been found of some use in gôitre and scrofula. *Sea-water* internally is an emetic and purgative; as a bath it has all the effects of an ordinary cold bath, with the addition of exerting a more stimulant action on the skin than fresh water, owing to its saline contents. It has been found serviceable in rickets, enlargement of glands, or joints, some chronic cutaneous eruptions, scrofula, and many chronic diseases.

ARALIA HISPIDA.

Dwarf Elder.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Pentagynia.

BARK OF THE ROOT.

Description.—Aralia Hispida is a perennial plant, with a low *stem*, from one to two feet high, the lower part woody and shrubby, and thickly beset with sharp, stiff bristles, the upper part herbaceous and branching. The *leaves* are bipinnate; the leaflets oblong-ovate, acute, cut-serrate; *umbels* many, simple, globose, axillary and terminal, on long peduncles, followed by bunches of dark-colored, nauseous berries. It flowers from June to September. The whole plant exhales an unpleasant odor.—*W.*

History.—This is a low undershrub, growing from New England to Virginia, in fields, hedges, rocky places, and along the roadsides. The fruit is round, black, and one-celled, containing three irregular-shaped seeds. The bark of the plant is employed in medicine, but that of the root is the most active. It yields its virtues to water. It is known in various sections of the country by the names of *Wild Elder*, *Bristlestem-Sarsaparilla*, etc.

Properties and Uses.—The leaves in warm infusion are sudorific. The bark is diuretic and alterative. Very valuable in dropsy, gravel, suppression of urine, and other urinary disorders. The juice and decoction of the fresh roots are said to be emetic and hydragogue, and have been found efficacious in dropsy. Dose of decoction, two to four ounces, three times a day.

Off. Prep.—Decoctum Araliæ.

ARALIA NUDICAULIS.

Small Spikenard.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Pentagynia.

THE ROOT.

Description.—Aralia Nudicaulis is a smooth, herbaceous, perennial plant, with a large, fleshy, horizontal, creeping, tortuous *root*, very long, about six lines in diameter, and yellowish or brownish externally; from this arises a solitary, large, compound, radical *leaf;* the *leaflets* being oval and obovate, acute, and finely serrate. A *scape* or *flower-stem* also arises from the root, which is shorter than the leaf, naked, about a foot high, terminating in three small, simple, many flowered *umbels* without involucres. The *fruit* is a small drupe or berry.—*L.*—*W.*

History.—This plant, sometimes known as *American*, *Wild*, or *False Sarsaparilla*, is indigenous, growing in moist woodlands, in the Northern and Middle States. The part employed is the root; it has an agreeable balsamic odor, and a pleasant, spicy, saccharine taste. It yields its virtues to water or alcohol.

Properties and Uses.—Small Spikenard possesses alterative properties, and is used in decoction or syrup as a substitute for Smilax Sarsaparilla in all cases where an alterative is required. It is likewise used in pulmonary diseases. Externally, a decoction of it has been found beneficial as a wash in zona (shingles) and in indolent ulcers.

The Aralia Racemosa, *Pettymorrel*, or *Spikenard*, has a herbaceous, widely-branched, smooth *stem*, three or four feet in height, dark-green, or reddish, and arising from a thick aromatic root; the *leaves* are decompound; the *leaf-stalks* divide into three partitions, each of which bears three or five large, ovate, pointed, serrate, slightly downy *leaflets*. *Umbels* numerous, small, arranged in branching racemes from the axils of leaves or branches.—*W.* It flowers in July, and grows in rich woodlands. The root is large, spicy, and aromatic, and possesses properties similar to that of the A. Nudicaulis; it is much used in pulmonary affections, and enters into the Compound Syrup of Spikenard.

Off. Prep.—Syrupus Araliæ Compositus.

ARALIA SPINOSA.

Prickly Elder.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Pentagynia.

BARK.

Description.—The Aralia Spinosa, sometimes called *Toothache Tree*, *Southern Prickly Ash*, and *Angelica Tree*, is a small tree, with an unsymmetric, naked *stem*, about ten or twelve feet high, but taller in warm latitudes, having prickles below, and the leaves all crowded near the summit. The *leaves* are on long, prickly petioles, very large, prickly and bipinnate; the *leaflets* are ovate, acuminate, serrate, sessile, glaucous beneath. The *umbels* are numerous, forming a very large panicle; *involucres* small, few-leaved. *Flowers* white, appearing in August and September; *berries* juicy and blackish.—*W.*

History.—The Prickly Elder inhabits the United States in various parts, from Pennsylvania to Louisiana, and westward to Missouri, growing in damp and rich woods and fields. The thin, ash-colored bark is the part used, although other parts of the plant possess medical properties; it has a peculiar, somewhat fragrant odor, and a slightly bitter, biting taste; alcohol or water extracts its properties.

Properties and Uses.—The fresh bark will produce vomiting and purging; but when dried it is a stimulating alterative, producing a determination toward the surface. The tincture has been used in syphilitic and rheumatic affections, and in some diseases of the skin. The warm infusion, especially when strong, is apt to induce vomiting. The berries in tincture have been found useful in lulling the pain from a decayed tooth, also in various painful affections of other parts. Much use was made of this bark by physicians in Cincinnati, during the cholera of 1849–50, in cases where cathartics were required, but where the action of every purgative was very difficult to control; the preparation was composed of one drachm compound powder of Jalap, one drachm Aralia Spinosa, and two drachms compound powder of Rhubarb. Given in powder, in half-teaspoonful doses; or the powder was infused in half a pint of boiling water, of which infusion, when cold, a tablespoonful was given every half-hour. In no case in which it was given, did it produce a tendency to looseness or choleraic discharges.

It is a powerful sialagogue, and is valuable in diseases where the mouth and throat are dry and parched, as a very small portion of the powder will produce a moisture and relieve difficult breathing; also useful in sore-throat.

Off. Prep.—Decoctum Araliæ Spinosa ; Tinctura Araliæ Spinosa.

ARCTIUM LAPPA.

Burdock.

Nat. Ord.—Asteraceæ ; Cynaraceæ (*Lindley*). *Sex. Syst.*—Syngenesia Æqualis.

ROOT AND SEEDS.

Description.—By De Candolle this plant is named *Lappa Minor*, and by Gærtner, *Lappa Major*. It is a well-known weed, with a tapering, fleshy, brown-colored *root*, from eight to fifteen inches in length, throwing off slender fibers. The *stem* is erect, three feet or more in height, solid, leafy, fleshy, round, furrowed, hairy, with many wide spreading branches; the *leaves* are large, alternate, petiolate, scattered, heart-shaped, undulated, veiny, three-ribbed at the base, somewhat hoary and downy beneath. *Flower heads* axillary, either sessile or stalked, generally globose, with little or no woolliness about the calyx. *Florets*, with their anthers and stigmas, purple; *corollas* five-cleft, regular, with a ten-nerved tube ; *stamens* with papillose filaments; *anthers* terminated by filiform appendages, and with subulate tails at the base. *Stigmas* free at the apex, diverging, curved outward. The *involucre* when in fruit easily breaks from its stalk, and is well known by the name of a Bur, sticking to the hair, clothing, or coats of persons and animals. *Receptacle* rather fleshy, flat, with stiff, subulate fringes. *Fruit* or *achenia* oblong, laterally compressed, smooth, transversely wrinkled, with a short, rough, prickly pappus; *seeds* quadrangular.—*L.*—*B.*

History.—Burdock is indigenous to Asia and Europe, and grows freely in uncultivated soils, in waste places, and around dwellings in this country, flowering in July and August. The root and seeds are the officinal parts ; the root is to be collected in the spring, and loses four-fifths of its weight by drying. It is subcylindrical, externally black-brown, internally white ; fleshy when recent, scaly when dried ; having a weak unpleasant smell; the bark has a subsaline, and the internal parenchyma a sweetish, mucilaginous taste. It contains sugar, gummy extractive, inulin, nitrate of potassa, etc. The seeds have a spicy, bitterish, subacrid taste.—*Ed. Duncan.*

Properties and Uses.—The root is alterative, aperient diuretic, and sudorific. A decoction of it has been used in rheumatic, gouty, venereal, leprous, and other disorders, and is preferred by some to that of sarsaparilla. —*Ed.* It is also useful in scurvy, scrofula, etc. The seeds are recommended as very efficacious diuretics, given either in the form of emulsion, or in powder to the quantity of a drachm. They form a good diuretic alterative, and are much used in diseases of the kidneys, and to remove boils and styes on the eyelids. An ointment of the leaves, or their juice, has been used advantageously in certain diseases of the skin, and obstinate ulcers. The dose of a decoction or syrup of the root, is from four to six fluidounces three or four times a day.

Off. Prep.—Infusum Arctii; Extractum Arctii; Syrupus Sarsaparillæ Compositus.

ARCTOSTAPHYLOS UVA URSI.

Uva Ursi.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

LEAVES.

Description.—This plant, known also as *Bearberry*, *Upland Cranberry*, etc., is a small perennial shrub, having a long, fibrous root. The *stems* are woody, trailing, and rooting, the young shoots only turning upward; the bark is deciduous and smooth. The *leaves* are alternate, obovate, acute at base, short petioled, coriaceous, evergreen, glabrous, shining above, paler beneath, entire, and in the young ones pubescent, the margin rounded, but scarcely reflexed. *Flowers* terminal, clustered. *Peduncles* short, red, reflexed, furnished at base with a short acute bract, and two minute ones at the sides. *Sepals* five, roundish, reddish, and persistent. *Corolla* ovate or urceolate, white with a reddish tinge, transparent at base, contracted at the mouth, hairy inside, with five short, reflexed segments. *Stamens* ten, very slightly adhering to the base of the corolla; *filaments* hairy; *anthers* reddish, each with two horns and two pores. *Ovary* round; *style* straight, longer than the stamens; *stigma* simple. *Disk* a black indented ring. *Fruit* small, globular, succulent, drupaceous, depressed, almost scarlet-colored, with an insipid mealy pulp, and five angular *seeds.*—*L.* This plant is the Arbutus Uva Ursi of Linnæus, and Willdenow, from which it was separated by Sprengel, principally on account of the difference of its berry.

History.—The Uva Ursi is a perennial evergreen, common in the northern part of Europe and America, growing on sterile gravelly ridges, and dry sandy soils. It flowers from June to September, and ripens its berries during the winter.

The leaves are the parts used; the *green* leaves alone should be selected, picked from the twigs in the fall, and dried by exposure to a moderate heat. They are about an inch long, and two or three lines wide, often spatulate in form, and are frequently adulterated with the whortleberry or cowberry leaves. These adulterations may be detected by observing that the uva ursi leaf is reticulated beneath, while the whortleberry leaf is merely dotted; the leaves of pipsissewa are longer, cuneate-lanceolate, and sharply serrated.

Uva Ursi leaves are odorless, except when in powder, which is of a light brown color, with a shade of greenish yellow, and has nearly the smell of good grass hay, and to the taste is at first smartly astringent and bitterish, which sensations gradually soften into a liquorice flavor. The leaves yield their properties to water or alcohol, forming with the latter a green tincture, which is rendered turbid by water, causing a deposit of green resin. Meissner found them to contain gallic and tannic acids, resin, oxidized extractive, gum with supermalates of lime and soda, chlorophylle, pectic acid, extractive, lignin, and water. Mr. Hughes found a peculiar principle called by him *ursin*, which contains their diuretic power.

" *Ursin*, is said by J. C. C. Hughes, to be prepared as follows: macerate one pound of the leaves of Uva Ursi in water for twelve hours, and displace until two quarts of liquor are obtained. Then precipitate the tannin with a solution of gelatin, and filter. Evaporate the filtered liquor to dryness, and dissolve the remaining extract in strong alcohol, and treat it with purified animal charcoal for twenty-four hours. Again filter, evaporate, and re-dissolve in absolute alcohol, and treat again with purified animal charcoal for twenty-four hours; filter and crystallize by spontaneous evaporation. Press the crystals, re-dissolve in absolute alcohol, treat with animal charcoal, filter, and again crystallize by spontaneous evaporation. The crystals are colorless, transparent, needle-shaped prisms, soluble in alcohol, ether, and dilute acid, but insoluble in fixed and essential oils. Subacetate of lead and carbonate of potassa precipitate its aqueous solution; lime-water, and tincture of chloride of iron do not affect it. It is neutral to test-paper, and combustible. One grain acted as a powerful diuretic."—*Am. Jour. Pharm., XIX., p.* 90. *Arbutin* and *Arctuvin* have also been obtained from the leaves by Kawalier, but their therapeutical influences are not positively known.

Properties and Uses.—The effects of this medicine depend entirely on its astringent and tonic powers. As an astringent it is applicable to all the purposes for which astringents are used, as in chronic diarrhea and dysentery, menorrhagia, diabetes, eneuresis, etc. In chronic affections of the kidneys and urinary passages it is frequently useful, in vesical catarrh, chronic gonorrhea, strangury, flour-albus, and excessive mucous discharges with the urine. Its tannic acid becomes oxidized and converted into gallic and pyro-gallic acids, and humus-like substance, which communicates a dark color to the urine. It undoubtedly lessens lithic acid deposits in the urine. In gonorrhea, with bloody and mucous discharges, and pain in the vesical region, it speedily allays all these unpleasant symptoms. Dose of the powder ten to sixty grains; of the decoction, one to three fluidounces, made by boiling one ounce of Uva Ursi with a pint and a half of distilled water to a pint; of the extract five to fifteen grains.

Off. Prep.—Decoctum Uvæ Ursi.

ARGENTI NITRAS.

Nitrate of Silver. Lunar Caustic.

Preparation.—" Two parts of pure Silver, in small pieces, are to be dissolved in three parts of pure Nitric Acid, sp. gr. 1.41, diluted with one and a half parts of Distilled Water, at a gentle sand heat,* and the clear solution—after decanting and filtering the last portions, if necessary—evaporated in a porcelain dish, at first over an open fire, and afterward, when it has become thick, under constant stirring with a glass rod, to perfect dryness in a sand-bath. On account of the nitric-acid vapors that are evolved, this process should be performed under a chimney with a good draught.

"If the crystallized salt is required, the dried mass is again dissolved in its weight of distilled water, and allowed slowly to evaporate in a sand-bath to about half; it is then placed for some days in a cool spot, the mother liquors poured from the separated crystals, and again slowly evaporated. The crystals are not dried on paper, but drained in the vessel in which they formed, dried, and kept in a bottle excluded from the light.

"When required in sticks, a portion is fused over a spirit-lamp, in a porcelain dish, being constantly stirred with a glass rod, and the liquid mass poured into a bright iron mold that has been previously warmed. The sticks as soon as cold, are removed, and the tubes wiped with dry filtering paper, to remove any adhering salt. Eight parts of pure silver yield twelve parts of nitrate."—*Witt.*

When silver is brought in contact with moderately-dilute nitric acid, a lively action ensues, even in the cold, yellow fumes are given off, and as the temperature rises the metal is rapidly and entirely dissolved. Before it can combine with the acid, the metal is converted into oxide, and this takes place at the expense of one portion of the acid, which separating into nitric oxide and oxygen, oxidizes three atoms of silver; the nitric oxide as it is given off abstracting two equivalents of oxygen from the air becomes hyponitric acid. Nitric acid sp. gr. 1.41, contains 54 per cent. of anhydrous acid; 4,050 parts of silver require 2,700 parts of anhydrous acid, which is contained in 5,000 parts of 54 per cent.; rather more acid than this must be taken, to allow for a portion which evaporates during the solution of the metal. The liquid is allowed to deposit,† and the clear portion evaporated to dryness to insure the absence of any free acid, then dissolved in water and crystallized. All organic matter must, from this as well as all other silver salts, be carefully excluded, as they facilitate their reduction and discoloration, consequently the crystals must not be dried on filtering paper. To fuse the salt, a porcelain dish is most convenient; it is sometimes recommended to rub the surface of the mold with oil; but this is unnecessary and unadvisable, as the sticks slide equally well out of the dry and polished cylinders, and the oil will cause the gray appearance on their outer surface. The salt must be poured into the mold so soon as it is liquefied, as it soon begins to evolve nitric acid, and the oxide formed becomes reduced to a gray metallic covering which is prejudicial to the appearance of the preparation. If such a pellicle has formed (it will mostly remain in the dish after pouring out the fluid portion), a few drops of pure nitric acid must be added to the next portion of the salt, previous to fusing it. The salt must not be fused in an iron vessel.

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* If silver reduced from the chloride be made use of, it should be borne in mind that four parts of the latter yield three parts of metallic silver, which, being in a very fine state of division, must, in order to prevent too powerful an action, be added in very small portions and gradually.

† The black residue from silver, reduced by charcoal, is dried and reserved for another reduction, as it generally contains a little chloride of silver.

Chemical Properties.—If the solution be allowed to crystallize by evaporation and cooling, it assumes various forms, as hexangular or rhombic tables, or right rhombic prisms, of a transparent or colorless appearance, which turn black when exposed to the light, or to the direct rays of the sun. Light alone, however, does not decompose the solution of nitrate of silver, it requires the presence of organic matter or sulphureted hydrogen. The stick or rods of the salt, are at first white, but from the action of light, become grayish, and when broken they present a crystalline texture with a radiated surface. They differ from the crystallized nitrate only in form and color, and do not contain any water of crystallization, as has been supposed.

Nitrate of silver is a very heavy salt, having a sharp, metallic, and intensely bitter taste. One part of water at 60° F., dissolves it, and four parts of alcohol at 178°. These solutions should have no action on litmus paper. It does not deliquesce; melts at 426° F.; is decomposed at 600° F., parting with its oxygen and nitrous acid, and leaving the metal in a state of purity.—*C.* Its specific gravity is 3.521. It corrodes the soft tissues, and in contact with the hair, skin, nails, linen, and almost all organic substances, it stains them of an indelible black.—*Ed.* Stains of Nitrate of silver may be removed by first applying a strong solution of iodide of potassium, and afterward a solution of hyposulphite of soda; or, a solution of cyanuret of potassium will remove them; or, the application of tincture of iodine, and afterward liquor potassa. Indelible ink for marking linen, etc., owes its character to this salt; the common formula for this preparation is as follows: Take of Nitrate of silver five scruples, gum Arabic two scruples, sap-green one scruple; distilled water one fluidounce; mix together; with this the linen is to be marked, having had the following preparation or mordant previously applied; take of carbonate of soda half an ounce, distilled water four ounces.

"An ink has, however, been recently used, which does not require a mordant, flows freely from the pen, does not require a strong or long continued heat to develop the black mark, and which will not destroy the texture of the finest cambric. It is prepared thus: Dissolve Nitrate of silver one ounce, in a sufficient quantity of distilled water; also dissolve crystallized carbonate of soda one ounce and a half, in sufficient distilled water. Mix the two solutions; a precipitate ensues which must be collected and washed on a filter. Introduce the washed precipitate, still moist, into a Wedgewood's-ware mortar, and add to it tartaric acid eight scruples, rubbing them together until effervescence has ceased; add strong liquor ammonia in sufficient quantity to dissolve the tartrate of silver (about two ounces); then mix in archil half a fluidounce, white sugar four drachms, powdered gum Arabic twelve drachms, and add distilled water sufficient, if required, to make six fluidounces of the whole mixture."—*Am. Jour. Pharm.*, XIX., 103.

Nitrate of silver, especially in solution, should always be kept in bottles with glass stoppers, as cork quickly decomposes it. It is an anhydrous salt, and is composed of 116 parts or one equivalent of protoxide of silver, and 54.15 parts, or one equivalent of nitric acid ($AgO+NO_5$), and is *incompatible* with all waters containing salt, phosphoros, charcoal, vegetable astringent solutions, several chlorides, most acids and their salts, earths, and alkaline solutions.

This salt is liable to adulterations, among the principal of which are the nitrates of lead, copper, zinc, and potassa; or it may contain free silver, by being subjected to excess of heat while melting it. It almost always contains a small proportion of free silver when in sticks, which may be known by the undissolved black powder present in its solution in distilled water. Precipitate a solution of Nitrate of silver by an excess of chloride of sodium; if this precipitate is entirely soluble in ammonia the salt is pure; if not, lead is present. Sulphureted hydrogen passed through the liquid, after having removed the above precipitate, gives a white precipitate if zinc be present, and black if there be any copper. Nitrate of potassa may be suspected when a colorless fracture is presented upon breaking the sticks, and when the salt is entirely soluble without the black powder sediment. It is readily distinguished by precipitating all the silver as chloride, removing other metals by sulphureted hydrogen, and evaporating to dryness, when the nitrate of potassa will be found in the residue. Impurities, without regard to their character, may be ascertained by dissolving 29 grains of the salt in a fluidounce of distilled water, to which 9.12 grains of muriate of ammonia are to be added; briskly agitate the mixture for a few seconds, and then allow it to rest, until precipitation has ceased; then if, on the addition of more muriate of ammonia, no further precipitation ensues, the salt is impure.—*Ed.*

Properties and Uses.—Some practitioners consider this salt as a tonic and nerve-stimulant, and employ it to fulfill these indications, in epilepsy, chorea, angina pectoris, etc., as well as administering it in intestinal ulceration during typhoid fever, diarrhea, etc. However, it is seldom used as an internal agent, but externally as an escharotic, either dissolved in distilled water, or in the solid form. When employed in solution, its strength is varied, according to the condition of the parts to be acted upon, and the character of the affection—from five to eighty grains to the fluidounce of water. It has been beneficially applied to ulcers, warts and other growths, fungous flesh, chancres, and in ulcers of the cornea, some forms of ophthalmia, fetid discharges from the ear, aphthous affections of the mouth, and spongy gums. It has likewise been recommended as a topical remedy in erysipelas and various other external inflammations, leucorrhea, gonorrhea, uterine ulcerations, granulations, and excoriations, and stricture of the urethra; also in ringworm, and some other forms of chronic cutaneous diseases. A solution of it is highly recommended in chronic laryngitis, pharyngitis, pertussis, asthma, and venereal ulceration of the throat, applied by means of a sponge fastened to one end of a piece of whalebone. The solid stick is sometimes used in ulcerations of the throat, and chilblains. If the pain be excessive from the application of the nitrate, it may be at once relieved by washing the parts with a solution of common salt, which decomposes it, and converts it into the insoluble chloride of silver. The same article is an antidote to its poisonous effects when taken internally in too large doses. In obstinate or severe dysentery, after having first cleansed the rectum by an injection of soap and warm water, another injection composed of nitrate of silver ten grains, distilled water one fluidounce, should be given, and repeated in an hour, if necessary. The second or third injection usually effects a cure. For a child less than a year old, one grain of the nitrate to the fluidounce of water, and so in proportion. *W. H. Parsons*, *College Journal*, *Cincinnati*, *O.*, III., 269. The dark color of the skin produced by the internal use of nitrate of silver, generally remains for life. Duncan states that it is said to be at last removed by a steady course of cream of tartar; and Pereira suggests, to wash the body with dilute nitric acid daily, at the same time administering it internally. For the purpose of operating with greater safety in cavities where the fracture of the caustic might be dangerous, Chaissaignac employs nitrate of silver fused round a platina wire; thus applied it adheres firmly to the wire, even when cracked.

ARISTOLOCHIA SERPENTARIA.

Virginia Snakeroot.

Nat. Ord.—Aristolochiaceæ. *Sex. Syst.*—Gynandria Hexandria.

ROOT.

Description.—Aristolochia Serpentaria, also called *Snakeroot* and *Snakeweed*, is a perennial herbaceous plant, with an extremely fibrous, knotty, brown root, sending up numerous stems. The *stems* rise singly or severally from the same root, they are erect, simple or branched, jointed, flexuous, cylindrical, often with a reddish tinge, and most commonly under a foot high. The *leaves* are alternate, on short petioles, oblong, entire, acuminate, heart-shaped, at base three-nerved, more or less downy on the surface, and having a slightly yellowish tint. The *flowers* grow close to the ground, curve downward, have a stiff leathery texture, and a dull brownish-purple color. The *peduncle* which supports them has one or more bracts, and gradually enlarges into a furrowed obovate ovary. The *calyx*, like others in this singular genus, consists of a long contorted tube, bent in the form of the letter S, swelling at its two extremities, having its throat surrounded by an elevated edge or brim, and its border expanded into a broad, irregular margin, forming an under and upper lip, which are closed in a triangular manner in the bud, dull-purplish or red. *Corolla* none. *Anthers* twelve in number, growing in pairs to the sides of the fleshy *style*, which is situated in the bottom of the calyx, and covered by a firm spreading, convoluted *stigma*, which extends over the anthers. *Capsule* obovate, six-angled, six-celled, with numerous small flat seeds.—*B.*—*L.*

History.—Several species of Aristolochia have been confounded with the above, but as they are nearly identical in medical properties, it is of but little importance; they are the *A. Hirsuta* growing in the Southern States, and strongly resembling the above; the *A. Hastata* of Nuttall, or *A. Sagittaria* of Muhlenburg, growing in the South; the *A. Reticulata* of South-western growth, as well as the A. *Tomentosa.*

Aristolochia Serpentaria is found in rich woods, hedges, and thickets from Connecticut to Illinois, and southward to Louisiana, being more common near the Alleghanies, and flowering from April to July. In commerce the dried root consists of a short, knotty premorse root-stock or head, with very numerous radicles, three inches or more in length, filiform, flexuous, interlaced and brittle, the epidermis being greenish-yellow or brown, the parenchyma yellowish-white, and the pith ferruginous. It has a pungent smell, not unlike that of valerian, with camphor and turpentine, and a warm, bitterish, pungent taste, very much resembling that of camphor.—*Ed.* Its active principles are extracted by water, alcohol, or proof-spirit. The tincture is bright green, and is rendered turbid by water. Bucholz found it to contain volatile oil, yellowish gum resin, extractive, gummy extract, woody fiber, and water. More recently Chevallier has found volatile oil, resin, extractive, starch, ligneous fiber, albumen, malate and phosphate of lime, oxide of iron and silica. The oil is yellowish, of an odor and taste like that of valerian and camphor combined, and about half an ounce is furnished by one hundred pounds of the root. The oil may be procured in greater amount from the *A. Reticulata*, which is the most energetic of this family of plants.

Pink-root and Seneca are sometimes found mixed with the A. Serpentaria, as well as some other roots. These adulterations may be detected by the difference in the appearance of the roots, and of the leaves and stems when present, as well as by the absence of the peculiar Serpentaria flavor and smell.

Properties and Uses.—Virginia Snakeroot in small doses promotes the appetite and gives tone to the organs of digestion, and is very useful in cases of enfeebled stomach following exhausting diseases, especially in the form of vinous tincture. In full doses it stimulates the system, producing increased arterial action, diaphoresis, and frequently diuresis. In large doses it causes an uneasy sensation at the stomach, with sickness, vomiting, and purging, headache, drowsiness, and disturbed sleep, and in warm infusion it produces diaphoresis, and is beneficial in adynamic eruptive fevers, where the eruption is tardy, or has receded. In the typhoid stage of febrile diseases, where strong stimulants as brandy, etc., can not be borne, it will be found very available. In periodic fevers it may be advantageously used, with or without its combination with quinia. An infusion of it forms an excellent gargle in putrid sore-throat. Dyspeptics have been benefited by it in tonic doses, and amenorrhea has been cured, especially when caused by cold. When its use is too long continued, it occasions sickness at stomach, emesis, gripings and tenesmus. Long boiling impairs its virtues. A cold infusion is useful in convalescence from acute diseases. Dose of the powder as a tonic, three to six grains; as a stimulant, twenty or thirty grains; of the infusion one or two fluidounces; of the tincture a fluidrachm or two.

Off. Prep.—Infusum Serpentariæ; Extractum Serpentariæ Fluidum; Tinctura Serpentariæ Composita.

ARNICA MONTANA.

Leopardsbane.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT AND HERB.

Description.—Arnica Montana is a rather hairy plant, with a dark or blackish *root*, from which are given off numerous radicles. The *stem* is simple, pubescent, rough, obscurely angled, striated, one to three-headed, and from ten to twelve inches in height. The *leaves* are entire, opposite; the *radical ones* obovate or oblong, ciliated, and five-nerved; the cauline in one or two pairs. *Flowers* large, orange-yellow; *heads* erect, or drooping. *Involucre* cylindrical, rough with glands; *disk florets* many, tubular, five-lobed; *ray florets* about fourteen, strap-shaped, three-toothed, striated, and downy at base; *achenia* somewhat cylindrical, downy, ribbed, blackish, with a straw-colored, hairy pappus.—*L.*—*De Cand.*

History.—This perennial herb inhabits Siberia, also the cooler parts of Europe from the sea coast to the limits of constant snow, in moist, shady situations, flowering in June and July; it is likewise found in the northwestern parts of the United States. The whole plant has been used in medicine; more especially the flowers. The flowers are compound, radiated, yellow, with a calyx of linear equal follicles, the length of the disc, ligulate, floscules twice the length of the disc, two lines broad, three-toothed, with a sessile pappus, fragile and somewhat scabrous: taste acrid and bitterish; causing sneezing when rubbed with the fingers. The odor is unpleasant, but is much diminished, as well as the taste, by drying. They yield their properties to water or alcohol. The dried root is about the thickness of a small quill, flexuous, brown bark externally, rugose longitudinally, with a somewhat hard whitish wood, larger pith, and long, dense radicles on one side; its taste is aromatic, acrid, and slightly bitter. It should be gathered in the spring. Pfaff found it to contain volatile oil, acrid resin, extractive, gum and woody fiber. Chevallier and Lassaigne found the flowers to contain resin, a bitter nauseous substance resembling the *cytisin*, gallic acid, a yellow coloring matter, albumen, gum, muriate and phosphate of potassa, traces of sulphates, carbonate of lime and silica.—*T.* Mr. Bastick has announced the existence of an alkaloid in the flowers, which he calls *Arnicina.* It is not volatile, bitter, slightly soluble in water but more so in alcohol and ether. Its hydrochlorate is crystallizable.—*P.*

Arnicina is obtained from the flowers, by subjecting them to a process similar to that by which lobelina is extracted from lobelia inflata. It has a decided alkaline reaction, and combines with acids, forming a series of salts. It has a slightly bitter, but not acrid taste, and from the aqueous solutions of its salts, it is precipitated by tincture of galls in somewhat dense flocks; it is more readily soluble in alcohol and ether, than in water. A high temperature decomposes it, which also obtains when it is subjected to the action of caustic alkalies. It has not yet been employed in medicine, though it probably possesses the active principles of the Arnica in a concentrated form.—*Bell's Pharm. Jour. & Trans.*, *X.*, 386.

Properties and Uses.—In large doses, it causes heat in the throat, nausea, vomiting, spasmodic contractions of the limbs, difficulty of respiration, and sometimes inflammation of the alimentary canal, and coma. There is no known antidote to its poisonous influences; vegetable acids have been recommended.

In small doses, it accelerates the pulse, increases the perspiration, excites a flow of urine, and is said occasionally to cause headache and giddiness. In Germany, it is esteemed as a stimulant in typhoid fever and other adynamic febrile diseases, in chronic palsy, and amenorrhea; also, as a tonic in chronic rheumatism, and as a tonic and diuretic in the asthenic forms of dropsy. In intermittent fever it has proved very successful, also, in nyctalopia and amaurosis; and is reputed to be highly efficacious in constitutional derangements caused by powerful shocks to the brain, from thumps, kicks, etc., in internal pains, and congestions from bruises, deficient action of parts, etc. It has also been recommended in cases of deficient nervous sensibility, languid vascular action, and almost every disease where there is debility, torpor, or inactivity of function. Externally, it is used in the form of a fomentation, or diluted tincture of the flowers, both to prevent and discuss local inflammations, and to remove ecchymosis. Mr. J. M. Maisch prepares a *fluid Extract of Arnica*, which has been found very useful as an application for the bites of mosquitos and other insects, thus: Exhaust powdered Arnica flowers one pound, with diluted alcohol, filter, evaporate to the consistence of an extract, and redissolve this in two pints of ordinary alcohol.

Dose of the powder, five to ten grains, two to four times a day; of the infusion, made by adding half an ounce of the flowers to a pint of water, from half a fluidounce to a fluidounce; of the extract, which is an excellent form of administration, from five to ten grains, four or five times a day. In preparing an infusion of the flowers, they should be loosely tied in a bag, in order to prevent the down or fine fibers from getting into the infusion, or else they will cause troublesome irritation of the throat, nausea, and vomiting.—*Ed.*

Off. Prep.—Infusum Arnicæ; Tinctura Arnicæ.

ARTEMISIA ABSINTHIUM.

Wormwood.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

TOPS AND LEAVES.

Description.—Artemisia Absinthium is a perennial suffruticose plant, with a woody *root* branched at the crown, and having numerous fibers below. The *whole herb* is covered with close, silky hoariness; the *stems* are numerous, bushy, growing from one to two feet in height, round, furrowed, and panicled at their summit; their lower part exists for some years, from which young shoots spring forth every year, decaying in cold weather. The *leaves* are alternate, doubly or triply pinnatifid, with broadish, blunted, entire segments; rather greener on the upper side; *lower ones* on long petioles; *upper* on shorter, broader, somewhat winged ones; *floral leaves* lanceolate; all are canescent. *Flower-heads* on aggregate, leafy clusters, stalked, drooping, hemispherical, of numerous, pale-yellow or buff florets; *ray florets* few. *Styles* very deeply cloven. *Receptacle* convex, clothed with fine upright hairs.—*L.*

History.—Wormwood grows in various parts of Europe, the Crimea, Siberia, Barbary, Newfoundland, and in the United States. It flowers from June to September. The dried herb with the flowers have a whitish-gray appearance, a strong, aromatic, and somewhat unpleasant odor, and an extremely bitter taste. Alcohol, or water takes up its active principles. Braconnot found it to contain volatile oil, green resin, bitter resin, albumen, starch, azotized matter having little taste, bitter azotized matter, woody fiber, absinthate of potassa, nitrate of potassa, etc.

Absinthine, the bitter principle of *A. Absinthium*, may be obtained as follows: Exhaust the dry herb, with alcohol of 0.863, and distill the clear liquid to the consistence of a syrup, transfer the residue into a glass-stoppered bottle, and shake it well with ether. After some time this separates with a yellowish-brown color; and this treatment with ether is to be repeated until it no longer has a very bitter taste. The ethereal liquid is to be distilled in a water-bath; the residue will consist of a viscid mixture of a blackish-brown acid resin, and Absinthine. Treat it with water to which a few drops of ammonia have been added, and the black smeary resin will be principally taken up, and the greater portion of the Absinthine be left behind. In proportion as it becomes purer it acquires a pulverulent form. On adding a further quantity of ammonia, the Absinthine is also dissolved;

but on triturating with concentrated ammonia, far less passes into solution, because the compound of ammonia with Absinthine is very sparingly soluble in ammonia. To remove the ammonia, digest it with dilute hydrochloric acid, then wash it with water, dissolve it in alcohol, and add solution of acetate of lead to it as long as any turbidity results, then filter, and pass sulphureted hydrogen into the liquid to decompose the excess of the lead salt. The alcoholic solution is to be filtered from the sulphide of lead, mixed with a small quantity of water, and allowed to evaporate slowly in a warm place, when the Absinthine separates in yellow resinous drops. These are soft, and when mixed with water, become coated with an opaque membrane, and in the course of some weeks all the drops become converted into hard masses, which are jagged and rough externally, and internally are radiate and indistinctly crystalline.

Absinthine thus obtained is yellow, or brownish-yellow; its powder is yellowish, of a faint, disagreeable, bitter odor of wormwood, an intensely bitter taste, and dissolves readily in alcohol, concentrated acetic acid, solutions of ammonia, and caustic potassa, sulphuric and hydrochloric acids. It is less soluble in ether, hardly at all in water, but melts in boiling water. It has not been much used in medicine, but probably possesses the medicinal principles of the plant, and may be found tonic, hepatic and anthelmintic.—*Am. Jour. Pharm.*, *XXIII.*, 358.

Properties and Uses.—Anthelmintic, tonic, and narcotic. Used in intermittent fever, jaundice, and worms. It is also used to promote the appetite in atonic dyspepsia, amenorrhea, chronic leucorrhea, obstinate diarrhea, etc. Combined with a fixed alkaline salt, it proves powerfully diuretic. Externally it is very useful in fomentations for bruises and local inflammations, and has also been advised as an external application in chronic affections of the abdominal viscera, either in the form of tincture, infusion, or poultice. When Wormwood is used in too large quantity, it irritates the stomach, and increases the action of the heart and arteries. Dose of the powder, ten to twenty grains; infusion, one to two fluidounces.

The *Artemisia Abrotanum* (Southernwood), *A. Santonica*, and *A. Vulgaris* (Mugwort), possess similar properties. The *A. Vulgaris*, has been reputed beneficial in epilepsy, hysteria, and amenorrhea. *Santonin*, or Santonicin, is a peculiar white crystallizable principle, derived from the *A. Santonica*, and some other species; it is soluble in ether and alcohol, and is very efficacious as a vermifuge, given in doses of three or four grains, twice a day. The high price of santonin, and the difficulty experienced in obtaining it pure, has induced M. Gaffard to endeavor to obtain from the wormseed a product which may possess the advantages of the former, and at the same time be free from the objections to the use of the latter. This product he calls *Brown* or *Impure Santonin;* it is obtained as follows: Take of Aleppo wormseed three ounces; carbonate of potassa one ounce; slaked lime, sifted, half an ounce; water from three to three and a half pints. Place the mixture on the fire, stirring occasionally with a wooden spatula; let it boil for half an hour; on removing it from the fire, pass it with expression through a linen cloth; let it settle, decant and add hydrochloric or nitric acid until it reddens litmus without being sensibly acid to the tongue. Allow it to rest, pass it through a filter previously moistened, or through a piece of close canvas, and allow the product which remains on the filter to dry in the open air, until it acquires the consistence of firm butter. This product, which is a mixture of santonin, resin, and essential oil, will answer for the various pharmaceutic forms in which the practitioner may wish to exhibit it. M. G. gives it in the form of lozenges, composed as follows: Place in a marble mortar, brown santonin three drachms; add by degrees, and with constant trituration, powdered sugar thirteen ounces, mixed with powdered gum one ounce and a half, and oil of lemon twenty-five drops, so as to make a homogeneous powder. Form with a sufficient quantity of water a mass of the desired consistence, and divide into lozenges, each of which shall weigh, when dried, fifteen grains; each lozenge will then contain somewhat more than one-third of a grain of brown santonin. For infants under six months, the dose is one lozenge night and morning; from six months to a year, two lozenges; from one to two years, three lozenges; from two to four years, four, night and morning; for those older, an extra lozenge for each year, to be given night and morning, and continued until the desired effects are produced, in every instance.

M. Lecocq obtains santonin by taking one part of semen-contra of Aleppo reduced to coarse powder, and boiling it for a quarter of an hour with ten parts of water, after which a sufficient quantity of slaked lime is added to render the liquor slightly alkaline; it is again boiled for ten minutes, then strained through a cloth, and the residue pressed. If it is not considered sufficiently exhausted, which may be ascertained by its leaving in the mouth the hot and pungent taste of semen-contra, it is boiled again with five quarts of water and a little slaked lime; it is then strained, and the residue submitted to pressure. The united liquors are evaporated until they do not weigh more than the semen-contra employed; they are then placed into a stoneware pot, allowed to cool, and then treated with an excess of hydrochloric acid. A fatty and resinous matter instantly separates, in thick flakes, which float, and santonin is precipitated as an impalpable powder; it is strained through a fine cloth; the santonin passes with the liquor, and the resinous matters remain on the cloth. This substance, which contains only very little santonin, is rejected. After a day's repose, the impure santonin is deposited at the bottom of the vessel. It is washed with distilled water, and purified by combining it anew with lime. For that purpose, it is put into a porcelain capsule, with about two quarts of distilled water, and boiled. A certain quantity (50 to 60 grammes) of pulverized quicklime is then added to it, and the combination is effected in a short time. The liquor is filtered and decolorized with animal charcoal, and then treated with hydrochloric acid, which immediately precipitates the santonin; collect this on a paper filter, and wash it with distilled water until the washing water does not redden litmus paper, and dry in a stove secured from the light. Thus obtained, santonin occurs in pearly-white bracteæ, of great brilliancy, and promptly becomes colored by light; it is therefore essential to keep it in a black glass flask and well corked.

It is important for the success of the above operation not to add an excess of lime in combining the impure santonin with this base, for the bibasic salt of santonin is very sparingly soluble in water; it is better to leave a slight excess of santonin; which will remain on the filter, and which may be treated anew with lime.

Off. Prep.—Absinthine; Infusum Absynthii.

ARUM TRIPHYLLUM.

Dragonroot.

Nat. Ord.—Araceæ. *Sex. Syst.*—Monœcia Polyandria.

CORMUS OR ROOT.

Description.—Arum Triphyllum (*Arisæma Triphylla*) is known by the several names, *Wake Robin*, *Indian Turnip*, *Jack-in-the-pulpit*, etc. It has a round, flattened, perennial *rhizoma*, the upper part of which is tunicated like the onion, and the lower and larger portion tuberous and fleshy, giving off numerous long, white radicles in a circle, from its upper edge; the under side is covered with a dark, loose, wrinkled epidermis. The *spathe* is ovate, acuminate, convoluted into a tube at the bottom, flattened and bent over at the top like a hood, varying in color internally, being green, dark-purple, black, or variegated, with pale-greenish stripes on a dark ground, and supported by an erect, round, green, purple, or variegated *scape*, invested at the base by the petioles and their acute sheaths. The *spadix* is club-shaped, shorter than the spathe, rounded at the end, green, purple, black, or variegated, contracted into a narrow neck at the base, where it is surrounded by the stamens or ovaries. In the fertile plants, it is invested with roundish, crowded ovaries, each tipped with a stigma; in the barren, its base is covered with conical, fleshy filaments, each bearing from two to four circular anthers. Plants which are perfectly monœcious, and which are the least common, have stamens below the ovaries. The upper portion of the spadix withers, together with the spathe, while the ovaries grow into a large, compact bunch of shining, scarlet berries. The *leaves* are generally one or two, standing on long, sheathing footstalks, ternate; the *leaflets* oval, mostly entire, acuminate, smooth, paler on the under-side, becoming glaucous as the plant grows, and the two lateral ones somewhat rhomboidal.—*L.*—*B.*

History.—This herb inhabits the American continent, in both hemispheres, being found in wet locations, and flowering from May to July. The whole plant is acrid, but the root is the only part employed; it is of various sizes, seldom, however, exceeding two and a half inches in diameter, turnip-shaped, dark and corrugated externally, and milk-white within. When just dug up, it is fiercely acrid—too much so for internal employment; upon masticating it, it causes a persistent and intensely acrid impression upon the tongue, lips, and fauces, like that of a severe scald, with considerable prickling, and which is followed by slight inflammation and tenderness. Milk relieves this sensation, greatly modifying its intensity. It exerts no such influence upon the external skin, except upon long and continued application. The ordinary solvents do not extract the acrid element, which is exceedingly volatile, the root rapidly losing its acrimony by age. It should always be used when partially dried. Its activity may be preserved for a year or more by burying the root in sand. In addition to its acrid principle, it contains a large proportion of starch; also, gum, albumen, saccharine matter, etc. When the acrid property is driven off by heat, the root yields a pure, delicate amylaceous matter, resembling the finest arrow-root, very white and nutritive.

Properties and Uses.—Acrid, expectorant, and diaphoretic. Recommended in flatulence, croup, hooping-cough, stomatitis, asthma, chronic laryngitis, bronchitis, pains in the chest, colic, low stage of typhus, and various affections connected with a cachectic state of the system. Externally it has been used in scrofulous tumors, tinea capitis, and other cutaneous diseases. The powdered root may be given in half-scruple doses, increased, if required, to twenty or thirty grains, and repeated every three or four hours. It may be taken in sweetened mucilage.

Off. Prep.—Emplastrum Picis Compositum.

ASARUM EUROPÆUM.

Asarabacca.

Nat. Ord.—Aristolochiaceæ. *Sex. Syst.*—Dodecandria Monogynia.

ROOT AND LEAVES.

Description.—This plant, sometimes called *Hazlewort*, or *Wild Nard*, has a creeping root or rhizoma, entangled, with numerous, stout, branching fibers. The *stems* are very short, simple, round, herbaceous, pubescent, each bearing two dark-green, shining, reniform, obtuse, entire, somewhat downy *leaves*, which are opposite, two inches wide, and on long, downy footstalks; also, one drooping *flower*, not an inch long, fleshy, of a dusky-purple color, and placed upon a short terminal peduncle. The *calyx* is campanulate, greenish at the base, divided into three-pointed purplish segments, which are erect, and turned inward at their extremity. *Corolla* wanting. The *filaments* are twelve, and prolonged beyond the anthers into a small hook. The *style* is surmounted by a six-parted reddish stigma. The *fruit* is a six-celled capsule, coriaceous, and crowned with the persistent calyx.—*L.*

History.—This is a European plant, growing in moist, hilly woods, and presenting a single, bell-shaped, dingy-brownish red flower from May to August. The root and leaves are used in medicine, and when recent, are quite acrid. The root is ash-colored, two or three lines in thickness, four-angled, contorted, rough; has a pepper-like odor, a biting, spicy taste, and yields an ash-colored powder. Its properties are taken up by water or alcohol; boiling evaporates, and age impairs them. The leaves have virtues similar to those of the root; they have a very feeble odor, a taste like that of the root, with some bitterness, and give a green powder, having a yellow tinge. Gräger has found in the root, volatile oil, asarum camphor, asarite, asarin, tannic acid, resin, starch, extractive, gluten, albumen, various salts, etc.; in the herb, asarin, tannic acid, extractive, citric acid, chlorophylle, extractive, etc.—*P.* The root and leaves of this plant should always be carefully dried for preservation.

Properties and Uses.—Emetic, cathartic, and errhine. Used principally as an errhine in certain affections of the brain, eyes, face, and throat, toothache, ophthalmia, and paralysis of the mouth and tongue. Internally, it is a stimulant in doses of ten or twelve grains; and an emetic in half-drachm or drachm doses. Said to be used in France by drunkards to produce vomiting.

ASARUM CANADENSE.

Wild Ginger.

Nat. Ord.—Aristolochiaceæ. *Sex. Syst.*—Dodecandria Monogynia.

ROOT.

Description.—Asarum Canadense, likewise called *Indian Ginger*, *Coltsfoot*, *Canada Snakeroot*, has a close resemblance to the A. Europæum. The *rhizoma* is creeping, fleshy, somewhat jointed, yellowish, with rootlets. The *stem* is quite short, forked, each branch bearing a reniform *leaf*, downy on both sides, three or four inches by three or five; the *petioles* are long, round, hairy. The *flower* is solitary, growing from the fork of the stem, upon a pendulous, hairy peduncle. The *calyx* is very woolly, consisting of three broad, concave, pointed leaflets, of a brownish, dull-purple or greenish color on the inside, at top and bottom, depending on the amount of light which the plant enjoys, and terminated by a long, spreading, inflected point, with reflexed sides. *Corolla* wanting. *Stamens* twelve, awl-shaped, the alternate ones longer, inserted upon the ovary at a distance from the calyx. *Ovary* inferior, turbinate, somewhat hexagonal; *style* conical, striated, and parted at the top into six recurved, radiating *stigmas*. *Capsule* six-celled, coriaceous, not bursting.—*L.*—*B.*

History.—Wild Ginger is a native of the United States, growing in woods and mountains, and flowering in May and June. The whole herb has a fragrant odor, and a spicy, amarous taste. The root is the part used, and yields its active principles to alcohol, and partially to water by infusion. It consists of crooked, ash-brown pieces, of various lengths, from one to five lines in diameter, corrugated, pulverable, and whitish internally. It contains an acrid, bitter, reddish resin, a pale, spicy, aromatic, volatile oil, gum, chlorophylle, fat, starch, and various salts.

Properties and Uses.—Asarum Canadense is a spicy, stimulating agent, causing perspiration, promoting expectoration, and possessing carminative properties. It may be advantageously added to tinctures and compounds to improve their flavor, and render them more stimulating. It is used in colic and other painful affections of the stomach and bowels where no inflammation exists, and in chronic pulmonary affections. Used also as an errhine. Dose of the powder, half a drachm; of the tincture half a fluidrachm to two fluidrachms.

Off. Prep.—Tinctura Lobeliæ Composita.

ASCLEPIAS CORNUTI.

Common Silkweed.

Nat. Ord.—Asclepiadaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—Asclepias Cornùti (the *Asclepias Syriaca* of Linnæus), known as *Milkweed* in many parts of the country, has a large, stout, simple, somewhat branched *stem*, growing from two to five feet high. The *leaves* are ovate-elliptical, spreading, opposite, with a short but distinct petiole, gradually acute, and tomentose beneath. The *flowers* are fragrant; *umbels* several, axillary, subterminal, nodding, dense, globose, each of twenty or more flowers. *Calyx segments* lanceolate. *Corolla* pale or greenish-purple, reflexed, leaving the corona, which is of nearly the same hue, quite conspicuous. But few of the flowers prove fertile, producing oblong, pointed pods or follicles covered with sharp prickles, which contain a mass of long, silky fibers with seeds attached, and which fibers have been used for beds, pillows, and in the place of fur in manufacturing hats.—*G.*—*W.*

History.—This herb is indigenous to the United States, inhabiting rich soils, uncultivated fields, etc., and bearing whitish purple flowers from June to September. When wounded it emits a milky fluid, which contains water, wax-like fatty matter, gum, caoutchouc, sugar, various salts, etc. A crystalline resinous substance, allied to lactucone, has been obtained from the juice of the *A. Cornùti*, to which the name of *Asclepione* has been given. It is procured by boiling and then filtering the juice, and separating the asclepione from the filtrate by ether, from which it may be subsequently obtained by evaporation, and purified by several washings with pure ether. Asclepione thus obtained, is a crystalline solid, without taste or smell, and is readily dissolved by spirits of turpentine, pure acetic acid, and sulphuric ether—*C. List.*

Properties and Uses.—Anodyne, emmenagogue, diuretic and alterative. Useful in amenorrhea, dropsy, retention of urine, dyspepsia, asthma, cough, dyspnœa, also in scrofulous and rheumatic disorders. Both the root and inspissated milky juice possess anodyne properties. Dose of the powder, ten to twenty grains; of the decoction, two to four ounces; of the tincture, ten to sixty minims.

ASCLEPIAS INCARNATA.

Swamp Milkweed.

Nat. Ord.—Asclepiadaceæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—This plant is known by various names, as *Swamp Silkweed*, *Flesh-colored Asclepias*, *Rose-colored Silkweed*, *White Indian Hemp*, etc. It has a smooth, erect *stem*, with two downy lines above and on the branches and peduncles, branching above, and about three or four feet high. The *leaves* are opposite, oblong-lanceolate, acute, or pointed, obtuse at the base, on short petioles, and slightly tomentose. The *flowers* are red or reddish-purple, sweet-scented, and disposed in numerous *umbels* which are crowded, erect, mostly terminal, and often in opposite pairs. *Hoods of the crown* entire, *horns* exsert, subulate. The leaves are four to seven inches long, and from half an inch to an inch and a half wide; umbels are from two to six, on a peduncle two inches long, and consist of from ten to twenty small flowers. There are several varieties of this plant, the *A. Pulchra*, which is more hairy, with broader and shorter petioled leaves; the *A. Glabra*, which is almost glabrous, with two opposite longitudinal hairy lines on the stem, and leaves glabrous, with rough margins, midrib glandular below; and the *A. Alba* which has white flowers.—G.—*W.*

History.—This herb inhabits damp and wet grounds throughout the United States, and bears red flowers in July and August. On wounding the plant a milky juice exudes. The part used is the root; it varies in thickness from one to six lines, and is of a light-yellowish or brownish color. It imparts its properties to water.

Properties and Uses.—Anthelmintic, for which purpose the powder may be used in doses of ten to twenty grains, three times a day; or the decoction two to four fluidounces. It has been recommended in rheumatic, asthmatic, catarrhal and syphilitic affections, and as a vermifuge. Said to produce vomiting, and purging, but this is doubtful. It is undoubtedly a valuable agent, and worthy further investigation. It is useful in chronic mucous disease of the stomach.

ASCLEPIAS TUBEROSA.

Pleurisy-root.

Nat. Ord.—Asclepiadaceæ. *Sex Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant has several names by which it is known in various parts of the country, as *Butterfly-weed*, *Windroot*, *Tuber-root*, *Ascle-*

pias, etc, etc., but it is most commonly described as *Pleurisy-root.* It has a perennial, large, fleshy, branching, white, and sometimes fusiform-like *root*, from which numerous *stems* arise, growing from one to three feet high; these are erect, or more or less procumbent, round, hairy, green or red, and growing in bunches from the root. The *leaves* are alternate, the lower ones pedunculated, the upper sessile, vary from linear to oblong-lanceolate, hairy, dark-green above, paler beneath, waved on the edge, and in the old plants sometimes revolute. The *flowers* are numerous, erect, of a beautifully bright-orange color, and are arranged in terminal, rarely axillary *umbels*, which are corymbose. *Involucre* composed of numerous, short, subulate bracts. *Calyx* much smaller than the corolla, five-parted; the segments subulate, reflexed, and concealed by the corolla. *Corolla* rotate, five-parted, the segments oblong and reflexed. The *coronet* has five erect, cucullate leaves or cups, with an oblique mouth, having a small, incurved, acute appendage or horn, proceeding from the base of each, and meeting at the center of the flower. The *mass of stamens* is a tough, horny, somewhat pyramidal substance, separable into five anthers; each two-celled, bordered by membranous, reflected edges contiguous to those of the next, and terminated by a membranous, reflected summit. *Pollen masses* ten, distinct, yellowish, transparent, flat and spathulate, ending in curved stalks, which unite them by pairs to a minute dark tubercle at top; each pair is suspended in the cells of two adjoining anthers, so that if a needle be inserted between the membranous edges of two anthers and forced out at top, it carries with it a pair of the pollen masses. *Carpels* two, completely concealed beneath the stigma and anthers, ovate, with erect styles, terminated by a flat, pentagonal disk-like stigma. *Follicles* two, often one or both abortive, long, narrow, acuminated, green, with a reddish tinge and downy. Seeds ovate, flat, margined, and terminated by long silken hairs. —*B.*—*L.*

History.—This is a native of the United States, inhabiting gravelly and sandy soils, more common in the South, and flowering in July and August. Unlike the other plants of this family, Pleurisy-root is destitute of a lacteous juice. The officinal part is the root; it is spindle-shaped, of a light-brownish color on the outer surface, white, coarse, and striped within. When fresh it has a disagreeable, slightly acrimonious taste; when dried its taste is slightly bitter. Boiling water or alcohol extracts its virtues.

Properties and Uses.—Pleurisy-root is much used in decoction or infusion, for the purpose of promoting perspiration and expectoration in diseases of the respiratory organs, especially pleurisy, inflammation of the lungs, catarrhal affections, etc. It is likewise reputed carminative, tonic, diuretic, and antispasmodic. It does not stimulate. Acute rheumatism, febrile diseases, dysentery, etc., have been benefited by a free use of the warm infusion. In dyspeptic complaints it is frequently efficacious, and when combined with the *Dioscorea Villosa*, it is very beneficial in all cases of flatus in adults and children. A number of cases of prolapsus uteri have been cured under the use of one ounce of Pleurisy-root mixed with half an ounce of the root of Aletris Farinosa, and given in drachm doses, three times a day. In uterine difficulties this plant deserves further investigation. It is, undoubtedly, one of our most useful agents. Dose of the powder, one scruple to one drachm, three or four times a day; of a strong infusion, from two to four fluidounces four or five times a day, until perspiration is produced.

Two concentrated preparations are obtained from this article, termed *Asclepidin* and *Ascletine*. The former was first manufactured by Mr. W. S. Merrell, the latter by a firm in New York; of the particular method of preparing the latter, we have been unable to get any account. The *asclepidin* is a dark, semiliquid mass, and is prepared by evaporation or distillation of the saturated tincture in water, similar to the plan pursued for obtaining cimicifugin. It may be used for all purposes to which the crude article is applied in doses of from one to five grains, three or four times a day, or as may be indicated.

A pill composed of equal parts of *asclepidin* and *dioscorein*, will be found very beneficial in flatulency, borborygmi, and where persons are subject to flatulent and bilious colic. In some cases, especially of long standing, the addition of pulverized African ginger will much improve its efficacy.

Ascletine is said to be the active principle of the plant; it is a beautiful, white powder, with but little taste or odor, soluble in water, but insoluble in alcohol. It is recommended in the same diseases in which the root is employed, to fulfill similar indications, in doses of from one to three grains, three or four times a day. We have never seen or employed it, having reasons to suspect it an imposition upon the profession, as has been the case with many other so-called "concentrated remedies."

Off. Prep.—Extractum Asclepidis Hydro-alcoholicum; Infusum Asclepidis; Pulvis Asclepiæ Compositus; Pulvis Ipecacuanhæ Compositus; Tinctura Lobeliæ Composita; Asclepidin.

ASPARAGUS OFFICINALIS.

Asparagus.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE YOUNG SHOOTS.

Description.—Asparagus officinalis is a perennial plant, with an erect, herbaceous, unarmed, terete, very branching *stem*, from two to four feet high. The *leaves* are setaceous, flexible, fasciculate, filiform, of a pale pea-green color, and from half an inch to one and a half inches long; *flowers* axillary, solitary, or in pairs. *Berries* globose, red, three-celled. *Cells* two-seeded.—*W.*

History.—This herb is indigenous to Europe, and is extensively cultivated there, as well as in the United States as an article of diet. The root has a faintly saccharine flavor, but no odor, and is active only when in the recent state. The turiones (young shoots), which are employed as an article of diet by many, have a disagreeable taste, which is removed by boiling with water. Robiquet found in their juice, *asparagin* $C_8 H_8 N_2 O_6 + 2 HO$, which crystallizes in right rhombic prisms, also mannite, oleoresin, wax, albumen, salts, etc.

Properties and Uses.—Both the fresh root and shoots act as diuretics, communicating an unpleasant odor to the urine. A syrup or an extract may be prepared from them, the dose of the former being two or three fluidounces, of the latter from thirty to sixty grains. They are said to cause copious diuresis, and are reputed very beneficial in repressing an undue excitement of the circulatory system, and have been used with advantage in enlargement of the heart, dropsy, etc.

ASPIDIUM FILIX MAS.

Male Fern.

Nat. Ord.—Filices or Filicaceæ. Polypodiaceæ. *Sex. Syst.*—Cryptogamia Filices.

RHIZOMA.

Description.—Male Fern has a large, perennial, tufted, scaly rhizoma, sending forth yearly several *leaves*, three or four feet high, erect, disposed in a circle, oval, lanceolate, acute, pinnate, bright-green, and leafy nearly to the bottom; their *stalks* and *midribs* having tough, brown, transparent scales throughout; divisions alternate, taper-pointed, pinnate; the *pinnæ* or *leaflets* numerous, crowded, sessile, for the most part distinct, occasionally somewhat combined at the base, oblong, obtuse, crenate throughout, the lateral notches broadest and most shallow, the terminal ones more crowded and acute, without any terminal bristles; both sides smooth, and destitute of glandular globules, but a depression on the upper one over the insertion of each sorus. *Sori* circular, tawny, ranged in simple, close, short rows, near the partial midrib, and scarcely occupying more than the lower half of each leaflet. *Indusium* circular, durable, crenate, tumid, with a cleft terminating in the central depression. *Thecæ* numerous, shining-brown, prominent all round for a little beyond the indusium.—*Wo.*—*L.*

History.—Male Fern is found growing in all parts of Europe, and likewise in various sections of the United States. The dried root or rhizome is the officinal part, which divested of its leaf stalks and radicles is from eight to twelve inches in length, and an inch or two thick, compressed, tortuous, tuberculous, brown or dark-brown epidermis, yellowish, rarely reddish parenchyma, fragile, striated, almost inodorous, with a nauseous sweet taste, but at last becoming rancid, slightly astringent, and bitter. The fibrous radicles are covered with brown, paleaceous scales.—*Ed.* The fresh root is colored bluish-black by iodine, which is indicative of the presence of starch. From the first of June to the latter part of September is the proper time for collecting it,—when it should be cleansed, without being washed, then dried quickly in the shade and open air without heat, selecting those parts which are greenish internally, immediately pulverizing, and keeping in well-closed bottles. The powder is pale greenish-yellow, and has a peculiar, earthy, disagreeable odor, and the same taste as the crude root.—*C.* In two years the best article becomes useless. According to Geiger, it contains green fat oil, green resin, uncrystallizable sugar, easily oxidizable tannic acid, gum, salts, starch, and lignin. In addition to these, Bock found fixed and volatile oil, pectin, albumen, etc. According to Peschier, the fern-buds contain a volatile oil, brown resin, fat oil, solid fatty matter, green coloring principle, a reddish-brown principle, and extractive.

The oil may be obtained by digesting the powdered root in pure ether, filtering, and then distilling or evaporating the ether from the ethereal tincture. It is a thick black oil, having the taste and odor of the root, reddening vegetable blues, depositing stearin when left at rest, and yielding a little volatile oil when distilled from water. Alcohol partially dissolves it; it burns with a thick smoke, and is composed, according to Peschier of fat, resin, volatile oil, coloring matter, extractive, chloride of potassium and acetic acid.

Properties and Uses.—Male fern is used for the expulsion of the tapeworm. Bremser says it is an excellent remedy against the *Bothriocephalus latus*, but is not so efficacious against the *Tænia Solium*, and Merat entertained a similar opinion. According to Peschier, the best mode of administration is the ethereal oil or extract, of which eighteen grains, or from ten to twenty-five drops may be given in the form of pill or emulsion, at night, and again in the morning; two hours after the administration of the last dose, a purgative dose of castor-oil is to be taken, and the worm is discharged dead, without any severe or unpleasant symptoms. Dose of the powder, one to four drachms; of the ethereal tincture of the buds, eight to thirty drops, and which is made by digesting one part of the buds, in eight parts of ether.

ASTRAGALUS VERUS.

Tragacanth.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE GUMMY EXUDATION.

Description.—A small thorny shrub, a few feet in height, having the *stem* somewhat larger in diameter than the thumb, with dense, scaly branches. The *leaves* are about six lines long, and are divided into sixteen or eighteen linear, hispid *leaflets; stipules* at first downy, afterward smooth. The *flowers* are in clusters of from two to five, not large, papilionaceous, axillary, sessile, yellow. *Calyx* tomentose, obscurely five-toothed.—*L.*

History.—TRAGACANTHA or Tragacanth is obtained from several species of plants belonging to the genus *Astragalus*. The majority of the species furnishing *Gum Tragacanth*, are Asiatic plants, having rigidly persistent petioles, forming spines, but Botanists have not positively determined as to the particular plants. According to Olivier, the *A. Verus* yields the greater part, a low and very hispid shrub growing in the south-western countries of Asia. Though an excellent gum is obtained from the *A. Gummifer*, and some inferior kinds from the *A. Creticus*, and *A. Strobiliferus*. Tragacanth exudes naturally from July to September, either from wounds made in the shrub by animals, or from spontaneous fissures during the great heats of summer. According as the juice is more or less abundant, Tragacanth exudes in tortuous filaments, vermicular, elongated, rounded, or compressed, rolled up upon itself, or twisted. It is almost transparent, whitish, or of a yellowish-white. It also exudes in large tears, which have more or less of the vermicular form; this is more of a reddish color, and more contaminated with impurities.—*Ed.*

The best Tragacanth presents the appearance of very thin, pale-grayish, or grayish-yellow, almost parchment-like plates or scales, marked by spiral or circular ridges. It is semitrans parent, difficultly pulverizable, unless when thoroughly dried, and the mortar heated, or in frost, and is odorless and tasteless. It has the specific gravity 1.384.—*Thomson.* Is insoluble in alcohol or water, though it gradually swells in the latter fluid, forming a tenacious mucilage, part of it being dissolved; iodine added to the insoluble portion changes it to a blue color, indicating the presence of starch. According to Guerin Varry, Tragacanth contains arabin, bassorin, and starch, water, and when burned, ashes. *Arabin*, also named *Tragacanthin*, and *Adragantin*, is the soluble part of Tragacanth, and differs from gum Arabic in having no change produced in it by silicate of potassa, or perchloride of iron; oxalate of ammonia detects a calcareous salt in it. Bassorin is the insoluble part of the gum.—*P.* The composition of Tragacanth is not satisfactorily settled by chemists.

According to Sidney H. Maltass, Esq., Tragacanth is collected principally in Caissar, Yalavatz, Isbarta, Bourdur, and Angora. In July and August the natives clear away the earth from the lower part of the stem of the shrub, and make several longitudinal incisions in the bark, with a knife; the gum exudes the whole length of the incision, and dries in flakes, and in three or four days is collected. If the weather be hot and dry, the gum is white and clean; if it be damp with but moderate heat, the gum requires a longer time to dry, and assumes a brown or yellow tinge. When packed for exportation, the large, white, flaky, or *leaf* gum, termed *French quality*, is picked out, and the residue is sifted through a coarse sieve; what remains upon the seive is *common* or *sorts gum*, termed *English quality*. The gum which passed through the first sieve is now resifted in a finer sieve, that which passes through being termed *Sesame Seed*, and that remaining on the sieve, *Vermicelli*. All these latter varieties are carefully picked by women, who reject the impurities, and place the purer pieces with the first two qualities. Tragacanth he thinks probable is derived from more than one tree, and it is very liable to adulteration with Moussul gum and Caramania gum, two worthless articles, of a dark color; and which do not occur in flaky pieces, but which are pounded into small pieces after having been whitened with white lead.

Properties and Uses.—Tragacanth can only act as a demulcent; but on account of its insolubility it is rarely given internally. In powder, it is used as a vehicle for active and heavy medicines, for the purpose of giving cohesion and firmness to lozenges, and to form paste, which druggists use to label their prescriptions. Tragacanth one ounce, Gum Arabic, White Sugar, each two ounces, mixed together, in very fine powder, forms an excellent paste for covering microscopic slides with paper, as it dries quickly before it can become sour or moldy. It should be made into paste only as required for use.

ASSAFŒTIDA.

Assafetida.

Nat. Ord.—Apiaceæ, or Umbelliferæ. *Sex. Syst.*—Pentandria Digynia.

GUMMY RESINOUS EXUDATION OF FERULA ASSAFŒTIDA.

Description.—Ferula Assafœtida, *Linnæus*, or Narthex Assafœtida, *Falconer*, is delineated by Kœmpfer, who personally examined it. The *root* is perennial, fusiform, several inches in diameter, with a coarse, hairy summit, either simple like a parsnip, or with one or more forks; its bark is wrinkled, and blackish, and its internal structure is fleshy, white, containing a large amount of a thick, milky, fetid, alliaceous juice. The *leaves* are radical, springing up in the autumn, growing vigorously during the winter, and withering in the end of spring, several in number, one foot and a half long, shining, coriaceous like those of lovage, glaucous-green, pinnated, with pinnatifid segments whose lobes are oblong and obtuse; *petiole* terete, channeled only at the base. The *stem* is herbaceous, eight or ten feet high, about six inches in circumference at the base; solid, smooth, clothed with membranous sheaths. *General umbels* with from ten to twenty rays; *partial ones* five or six flowers. *Flowers* pale yellow. *Fruit* flat, thin, reddish-brown, like that of parsnip, only rather larger and darker, slightly hairy or rough. The plant varies somewhat owing to its location and the character of the ground.—*L.*—*Falconer.*—*Royle.*

History.—This plant is indigenous to Persia. The gum-resin is obtained by incisions into the upper part of the root, or by slicing it successively in small pieces; plants under four years are not made use of, as they yield but little, if any, of the juice. When the leaves begin to decay, the root-leaves and stem are twisted off close to the root, and the soil is removed from its crown. About forty days afterward, a thin slice is cut off transversely from its top, and a milky juice of a fetid, alliaceous odor gradually exudes. In about two days, or when this exudation has become hardened, it is scraped off, and another thin slice removed as before, from which juice again flows, and this process is repeated until no more juice can be obtained; while this collection is going on, the root is constantly protected from the solar rays. The concrete juice from several plants, are then put together, further hardened, and disposed of for home use or foreign exportation.

This gum-resin is brought to America in packages of various weights, but seldom less than fifty or sixty pounds each. It is in amorphous masses, of different sizes, of the consistence of wax, composed of agglutinated tears, which are whitish, but by the contact of air become rosy or reddish, and ultimately brownish, sometimes subdiaphanous, shining, surface tough, becoming soft under the fingers, having a bitterish, acrid taste, and a nauseous, alliaceous smell. The masses have an irregular, amygdaloid appearance, being composed of tears of various shapes and sizes consolidated together. Sometimes the tears are met with in distinct grains, of various sizes and forms, of the same color, odor and taste, as in the lumps. Those masses should be selected which are clear, of a pale, reddish color, and variegated with a great number of white tears, and, on burning, they should not have an odor of pitch. Berzelius and Thomson give as its specific gravity, 1.327. Age hardens it, and impairs its properties; it becomes pulverable at a diminished temperature, as in frosty weather; in warm weather it becomes soft and adheres to the pestle. Moderate heat softens it so far that it may be squeezed through a coarse cloth, and freed from impurities of a mechanical nature; a stronger heat causes it to froth up, and at a red heat it burns with white flame. Rubbed with cold or warm water, the gum is dissolved, forming a smooth white or reddish persistent emulsion, in which the resin and volatile oil are suspended. With rectified alcohol it forms a clear, yellowish-red tincture, which is its best menstruum. Spirit dissolves the resin and oil, but is too feeble a solvent. Sulphuric ether dissolves the volatile oil and a portion of resin; solution of caustic potassa dissolves it almost entirely, forming an emulsion when the alkali is neutralized; and solution of ammonia dissolves the gum and oil, with part of the resin. It readily unites with other resins, gum-resins, and wax; and is best preserved in bladders kept in tin boxes.

Assafetida contains volatile oil, resin soluble in ether, a tasteless resin insoluble in ether, gum, bassorin, sulphate of lime, carbonate of lime, oxide of iron and alumina, malate of lime, etc. The volatile oil may be obtained by distillation with water or alcohol, at first it is pale-green, but becomes yellowish-brown by age, is lighter than water, of a powerfully offensive odor, and a taste peculiar to the gum-resin; it contains sulphur. This and the bitter resin are the active principles.

Properties and Uses.—Stimulant, antispasmodic, expectorant, emmenagogue and vermifuge.—*Ed.* Improper in inflammatory conditions of the system. Used in croup, pertussis, hysteria, infantile convulsions, flatulent colic, chronic catarrh, chlorosis, spasmodic nervous diseases of females, and, in combination with morphia and quinia, in sick or nervous headache. With podophyllin and cimicifugin it is beneficial in chorea. Likewise efficient in amenorrhea and dysmenorrhea, and as an injection in tympanitic abdomen, lumbricus and ascarides. Dose, in powder or pill, from five to ten or twenty grains; of the tincture, from thirty drops to two fluidrachmss.

Off. Prep.—Enema Assafœtidæ Composita; Tinctura Assafœtidæ; Tinctura Castorei Ammoniata.

ASTER PUNICEUS.

Red-stalked Aster.

Nat. Ord.—Asteraceæ, or Compositæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT.

Description.—The *root* of this plant is perennial and fibrous; the *stem* is hispid, paniculate above, furrowed, generally red, or at least on the south side, stout and tall, growing from three to six feet in height. The *leaves* are oblong-lanceolate, amplexicaul, and more or less auriculate at base, sparingly serrate in the middle with appressed teeth, rough above, nearly smooth underneath, pointed; *lower leaves* with remote serratures, rough edged, and rough on the upper surface, all acuminate and narrowed at the base. *Involucre* loose, longer than the disk; the *scales* linear-lanceolate, long, revolute, nearly equal, and in two rows. *Flowers* large, showy, and of a pale purple or lilac-blue color. *Rays* from fifty to eighty, long and narrow.—*G.*—*W.*

History.—This plant is found growing in various parts of the United States, in swamps, ditches, along the borders of small streams, and sometimes in dry soils. It flowers from July to October. The radicles or fibers of the root, are the parts used; they are about the size of a pipe-stem, having a pungent, aromatic odor and taste, with some bitterness and astringency. Water or alcohol extracts their active properties. This plant is variously known by the names of *Cocash*, *Meadow Scabish*, *Squaw-weed*, etc.

Properties and Uses.—Stimulant and diaphoretic. The warm infusion may be used freely in colds, rheumatism, nervous debility, headache, pains in the stomach, dizziness, and menstrual irregularities. This, together with the *A. Cordifolius* are probably equivalents of valerian.

The Aster Æstivus, named *Rheumatic-weed*, also *Sampson Snakeroot*, *Star-flower*, etc., resembles the above plant, having lanceolate, subclasping *leaves*, tapering to the apex; margin rough; *stem* branching from its base, erect, hispid; *branchlets* pilose; *involucre* scaly; *scales* lax, linear, acute, qual. *Flowers* middle-sized, and blue. It is found more abundantly west of the Alleghany mountains, and is recommended as an antispasmodic and alterative. Principally used in the cure of rheumatism in the form of infusion or tincture; recommended, however, in hysteria, chorea, epilepsy, spasms, irregular menstruation, etc., internally; and used both externally and internally in many cutaneous diseases, the eruption occasioned by the poison Rhus, and in the bites of venomous snakes. Dose of the infusion, one to four ounces; of a saturated tincture half a drachm to two drachms. This plant deserves further investigation.

ATROPA BELLADONNA.

Belladonna.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

LEAVES.

Description.—Atropa Belladonna, also known as *Deadly Nightshade*, *Dwale*, *Black Cherry*, etc., is a perennial herb, with a thick, branched, fleshy, creeping *root*, and annual, erect, round, dichotomously branched, leafy, slightly downy *stems*, about three feet high. The *leaves* are lateral, mostly two together of unequal size, ovate, acute, entire, soft, of a dull green color, smooth, and on short petioles. The *flowers* are imperfectly axillary, solitary, stalked, large, drooping, dark dull purple in the border, paler downward. *Calyx* green, five-parted, permanent, nearly equal. *Corolla* campanulate, with a short tube, limb divided into five shallow, nearly equal segments. *Stamens* five; *filaments* nearly as long as the corolla tube; *anthers* cordate, four-lobed; *stigma* capitate, two-lobed. *Fruit* a two-celled, many-seeded berry, subtended by the enlarged calyx; *seeds* reniform.—*L*—*Smith.* When bruised the whole plant exhales a fetid odor.

History.—This plant is common to Europe, growing among ruins and in waste places, blossoming from May to August, and maturing its berries in September; the whole plant possesses poisonous properties. The parts used are the leaves, which must be gathered while the plant is in flower. When dry, they are of a brownish-green or grayish-green color, scarcely any odor, a faint, bitterish taste, and readily yield their virtues to alcohol or water.—*C.* The root should be taken up in the spring, from plants at least three years old; it is from six to twelve or more inches in length, branched and spreading, fibrous, but pulpy and juicy in the recent state, white or grayish internally, brownish externally, an inch or two in diameter, nearly inodorous, and of a mawkish, slightly bitter taste. Water or alcohol is its menstruum. The extract is more commonly used than any other preparation. Belladonna contains, according to Brande's analysis, supermalate of atropia, pseudotoxin with malate of atropia and potassa salts, wax, chlorophylle, phytocolla, gum, starch, albumen, lignin, salts, etc.

Properties and Uses.—Belladonna is an energetic narcotic poison. In large doses, according to Pereira, it acts upon the cerebro-spinal system, as manifested by the symptoms, "dilatation of the pupils (mydriasis), presbyopia, or long-sightedness with obscurity of vision, or absolute blindness (amaurosis), visual illusions (phantasms), suffused eyes, occasionally disturbance of hearing (as singing in the ears, etc.), numbness of the face, confusion of head, giddiness, and delirium. The mouth and throat become dry, with difficulty of deglutition and articulation, constriction about the throat, nausea, vomiting, swelling and redness of the face, and sometimes irritation of the urinary organs, or an exanthematous eruption." If the dose be very large, the above-named symptoms will be produced but in a more violent form, with extravagant delirium, followed by sopor. Convulsions are rarely present; when it causes death, it is commonly by coma.

Medicinally, Belladonna is anodyne, relaxant, antispasmodic, calmative, with some diaphoretic and diuretic properties. It is exceedingly valuable and useful in convulsions, spasms, epilepsy, puerperal convulsions, neuralgia, chorea, pertussis, mania, painful menstruation, palsy, gouty and rheumatic affections, rigidity of os uteri, and all painful or irritable conditions of the nervous system. It is much in use as a prophylactic in scarlatina. Externally, it has been applied in extract to the parts around the eye, to dilate the pupil, before operating for cataract; also in iritis to prevent adhesions. For these purposes, a drop or two of an aqueous solution of the extract is sometimes placed upon the conjunctiva. The ointment or extract has also been applied locally in spasmodic stricture of the urethra, and of the sphincters of the bladder and rectum, in great pain along the female urethra, in strangulated hernia, spasmodic contraction of the uterus, etc.—*P.* The following has been recommended in neuralgia of the uterus: Mix together one grain and a half of alcoholic extract of Belladonna, and three-fourths of a grain of opium. Place the two extracts in the center of a little pledget of carded cotton, and fold it up so as to inclose the extract; tie it up with a very strong thread, and leave a double thread eight inches long attached to it. The plug is to be introduced into the vagina by the physician or patient, and placed upon the neck of the uterus, where it is to be retained from twelve to twenty-four hours. In very painful menstruation, accompanied by leucorrhea, from eight to fifteen grains of tannic acid, or geraniin may be added to the tampon. Dose of the powdered leaves, one to two grains, once or twice a day, and gradually increased till the peculiar effects of the medicine are produced; of the extract one-fourth of a grain to two grains.

The proper remedies in poisoning by it, are the stomach-pump, emetics and purgatives, cold to the head, and in the comatose stage, ammonia internally, with external stimulants, electro-magnetism, etc.—*C.* Bouchardat, and Suiz Rioya recommend iodine as an antidote, even when the symptoms of poisoning with Belladonna are of long duration: the compound solution of iodine may be given for this purpose.

Off. Prep.—Atropia; Emplastrum Belladonnæ; Emplastrum Belladonnæ Compositum; Extractum Belladonnæ Alcoholicum; Tinctura Belladonnæ; Unguentum Belladonnæ.

ATROPIA.

THE ALKALINE PRINCIPLE OF A. BELLADONNA.

Preparation.—Pereira gives the following as Mein's process modified by Liebig: "Fresh dried and powdered Belladonna Root is to be exhausted by Alcohol, sp. gr. 0.822. To the Tincture add Slaked Lime, in the proportion of *one part of lime to* 24 *parts of the dried root.* Digest for 24 hours, frequently shaking. Add, *drop by drop*, Sulphuric Acid to the filtered Liquor, till there is a slight excess; then filter again, and distill off rather more than half of the spirit. To the residue add some Water, and evaporate the remainder of the alcohol as rapidly as possible, but *by a very gentle heat;* filter again, and continue the evaporation until the liquid is reduced to the one-twelfth part of the weight of the root employed. To the cold liquid add, *drop by drop*, a concentrated solution of Carbonate of Potassa, to throw down a dark grayish-brown precipitate, taking care not to render the liquid alkaline. In a few hours filter again: add Carbonate of Potassa as long as a precipitate (Atropia) is produced; and in from 12 to 24 hours collect the Crystallized Atropia on a filter, press it between folds of blotting-paper, and dry it. To purify the dry, but impure Atropia, make it into a paste with water, and again squeeze between folds of blotting-paper; dry it, and dissolve in *five times its weight* of Alcohol. The filtered liquor is to be decolorized by shaking it with Purified Animal Charcoal, then deprived of the greater part of its alcohol by distillation, and afterward evaporated by a gentle heat, so as to allow the Atropia to crystallize."

W. T. Luxton recommends an easy process, by which he obtains about forty grains from a pound of the leaves: "A pound of the dry Leaves of Belladonna are to be boiled in Distilled Water sufficient to cover them, for two hours, and the decoction strained off through a coarse cloth into a large precipitating jar. The leaves are again boiled in a second water, and the decoctions mixed, to which *two drachms* of strong Sulphuric Acid are now added; the vegetable albumen is precipitated, and the clear liquor is drawn off with a syphon to a filter. A clear sherry-colored solution comes through, which is either decomposed by passing gaseous Ammonia through it, or by suspending in it a lump of Sesquicarbonate of Ammonia. In either case, the color becomes changed to black, and crystals of Atropia are slowly formed. At the expiration of a day or so, the supernatant liquor may be drawn off with a syphon, and the crystals thrown on a filter to dry. To decolorize them, about an ounce of spirit of ammonia may be poured on the filter, which washes away most of the coloring matter, leaving the crystals moderately white."

History.—Thus prepared, Atropia crystallizes from its hot solution in white, transparent prisms, with silky luster; and from its solution in dilute spirit, in needles like those of the sulphate of quinia; it is odorless, has a bitter acrid, somewhat metallic taste. It is soluble in one and a half times its weight of cold alcohol, 25 parts of ether, and 70 parts of boiling water; it fuses above 212°, and forms soluble salts with sulphuric, nitric, muriatic, and acetic acids. At an ordinary temperature, water dissolves about $\frac{1}{500}$th, but aided by heat a much larger portion is taken up; the solution has a bitter, disagreeable taste. Dr. A. von Planta found Atropia prepared by Merck to possess the following properties: It dissolved in 299 parts of water at the ordinary temperature; alcohol dissolved it in almost every proportion, ether less readily. Its solubility in all these fluids was increased by heat. At 194° F. it fused to a clear transparent mass, which became brittle on cooling; on the re-application of heat, and again allowing it to cool, it was converted into stellate groups of crystals. At 284° F. the greater portion is destroyed. Heated upon platinum foil, it melts, puffs up, gives off white fumes, and burns with a bright flame, leaving a shining black cinder, which finally disappears entirely. It has a strong alkaline reaction, and combines with acids forming uncrystallizable salts, soluble in water and alcohol, but sparingly so in ether. Its formula is $C_{34} H_{25} NO_6 = 289$.

Properties and Uses.—Same as Belladonna. Internally from one-twentieth to one-tenth of a grain may be given; and for external use it is generally preferred to the extract. To dilate the pupil of the eye, one grain of Atropia may be dissolved in 400 grains of water, to which five or six drops of acetic acid have been added, and a few drops of this solution be applied to the eye. To relieve neuralgic pains, the following may be rubbed on the affected parts, three times a day, using each time a piece about the size of a pea: take of Atropia *five grains*, Lard *three drachms*, Oil of Roses *one drop*; triturate thoroughly together. Dr. Lusanna has used it successfully in this affection, by the endermic and iatraleptic method. The skin being previously removed by a blister, or, what is still better, because more speedy, the ammoniacal pomade of Gondret, when the Atropia is dissolved in a small quantity of alcohol, then mixed with simple ointment and applied to the denuded surface. In this way, a half grain to a grain may be employed in the twenty-four or forty-eight hours. Iatraleptically, he uses the following ointment in the form of frictions over the part affected every two or three hours, consuming a portion the size of a pea each time: ℞. Atropia, 5 *centigrammes*, Alcohol at 36, *q. s.* Dissolve. Add Axungia, 12 *grammes*.

The London College prepares a sulphate of Atropia solely for external application, by adding half a fluidounce of distilled water to two fluidrachms of diluted sulphuric acid, in which seven scruples and a half of Atropia, or enough to form a saturated solution, are added; the solution is then filtered, and crystals obtained by evaporation with a gentle heat. M. Michea recommends the valerianate of Atropia in spasmodic or convulsive diseases, in doses of a milligramme per day for an adult, on commencing its use; he considers it superior to either valerian or belladonna, on account of its small dose, and its certainty of action.

AVENÆ FARINA.

Oatmeal.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

SEEDS OF AVENA SATIVA, GROUND.

Description.—Avena Sativa, or the common oat, has a smooth *stem*, from two to four feet high, with linear-lanceolate, veined, rough *leaves*, with loose, striate sheaths; *stipules* lacerate; *panicle* equal, loose; *spikelets* pedunculate, pendulous, two-flowered, both flowers perfect, the lower one mostly awned; *paleæ* somewhat cartilaginous, closely embracing the caryopsis; *root* fibrous, annual.—*W.*

History.—Oats have been noticed by the ancient Greek and Roman writers; at present they are cultivated in nearly all northern temperate latitudes. Their native country is unknown. When the seed is stripped of all its teguments, including its innermost, silky, fibrous covering, it constitutes *Groats;* and when this is ground into fine meal or flour it is called *Prepared Groats.* When the seed is kiln-dried, stripped of its husk and delicate outer skin, and then coarsely ground, it constitutes the Oatmeal of Scotland, a common farinaceous article of food for laboring people and children.—*C.* Vogel found Oats to contain 66 per cent. of meal, and 34 per cent. of husk; the dried meal consists of starch 59, saccharo-mucilaginous extract 10.75, albumen 4.3, oleaginous matter 2, ligneous fiber and moisture 24.—*T.*—*C.* Other analyses have been made, which vary from the above in quantity and elements, showing oats to consist of a large proportion of starch, some sugar, gum, oil, albumen, gluten, a nitrogenous body, epidermis, alkaline salts, etc. M. Payen found oats to contain starch 60.59 parts; gluten and other azotized matters 14.39; dextrine, glucose, or congenerous substances 9.25; fatty matters 5.50; cellulose 7.06; silica, phosphates of lime, magnesia, and soluble salts of potassa and soda 3.25.—*P.*

Oatmeal is odorless, is not so white as wheat flower, and has a somewhat bitterish taste; it is insoluble in alcohol, ether, and the oils; but the first two remove an oleo-resinous matter from it. Water removes its nourishing principles, when boiled with it.

Properties and Uses.—Nutritive and demulcent. Good in habitual constipation, but not in dyspepsia, accompanied with acidity of stomach. In the form of gruel, either salted or seasoned with sugar, honey, or the pulp of fruit, it is an agreeable nutritive during convalescence from acute diseases, in the puerperal woman, and in some chronic diseases. Oatmeal made into a cake with water, baked and browned like coffee, then pulverized and made into a coffee, or infusion, forms a drink which will allay nausea and check vomiting, in a majority of cases, when all other means fail, and used thus, is very useful in diarrhea, dysentery, cholera-morbus, and irritable conditions of the stomach. One ounce of Oatmeal in two quarts of water, boiled down to a quart and then strained, forms a very nutritive gruel. It may be rendered more palatable by the addition of vegetable acids, aromatics, sugar, prunes, etc.

BALSAMODENDRON MYRRHA.

Myrrh.

Nat. Ord.—Amyridaceæ, or Burseraceæ. *Sex. Syst.*—Octandria Monogynia.

CONCRETE GUMMY RESINOUS EXUDATION.

Description.—The Balsamodendron Myrrha, has a shrubby, arborescent *stem*, with squarrose, spinescent *branches*, a very pale gray *bark*, and a yellowish-white wood. The *leaves* are ternate, on short petioles; *leaflets* obovate, obtuse, somewhat tooth-letted at the apex, the lateral smooth. *Flowers* unknown; *Fruit* ovate, smooth, brown, somewhat larger than a pea, surrounded at base by a four-toothed calyx, and supported on a very short stalk.—*Nees.*—*De Cand.*

History.—The Myrrh-tree grows near Gison, on the borders of Arabia Felix, and has been seen by Captain Harris in hilly localities, throughout the flat territory between Abyssinia and the Red Sea.—*C.* The juice flows naturally, like cherry-tree gum upon the bark; at first it is soft and pale-yellow, but by drying becomes hard, darker and redder, and forms the medicinal Gum Myrrh. The best kind of Myrrh is in irregular pieces, often tuberculated, varying in size from that of a pea to that of a large walnut, or even larger, of a bright reddish-brown color, becoming clearer red when breathed upon. Internally they are brighter than on the surface, but varied with yellowish-white, opaque, semicircular or tortuous streaks. Myrrh is friable and readily powdered, and has a peculiar, agreeable, balsamic odor, and a bitter, aromatic, not unpleasant taste. When heated it softens, then froths up, and at length inflames and burns with difficulty. Its active constituents are oil and resin, and its proper solvent is rectified spirit. It is not wholly dissolved by water, ether, or proof-spirit; water dissolves its arabin, and the mucilage retains the oil and part of the resin in the state of emulsion; proof-spirit dissolves some of its resin. The tincture is transparent, and when poured into water forms a yellow opaque fluid, but lets fall no precipitate, while the watery solution is always yellow and opaque. Alkaline solutions are good solvents for Myrrh. According to Brandes, Myrrh consists of volatile oil 2.6, resin 27.8, gum 54.4, mucilage 9.3, salts, sulphates, benzoates, malates, and acetates of potassa and lime 1.4, foreign bodies 1.6. Of the resin 5.66 is soft and soluble in ether; the remainder is hard and insoluble in ether. According to Bley and Diesel, genuine Myrrh yields with nitric acid, a liquid of a dull yellow color; while Bdellium Indicum may be detected as an adulteration by its not dissolving in this acid, but becoming soft, whitish and opaque. M. Righini states that Myrrh is pure when it wholly and rapidly dissolves by triturating one part of it for ten or twenty minutes with one part of hydrochlorate of ammonia, to which fifteen parts of water are slowly added.

Properties and Uses.—Myrrh is a stimulant, especially to mucous tissues. It also exerts an antiseptic influence, and is used to promote expectoration, as well as menstruation. It has also been used as a vermifuge. Internally it promotes digestion, accelerates the pulse, and augments the heat of the body; it is not antispasmodic, and is contra-indicated in internal inflammations. It is generally used in enfeebled conditions of the body, and has been found useful in cases of excessive mucous secretion, as in gleet, chronic gonorrhea and chronic catarrh; also in laryngitis, bronchitis, humoral asthma, and other diseases of the air-tubes accompanied with profuse secretion, but expelled with difficulty. Reputed useful in suppressed menses, and some cases of anemia. As a local application to indolent sores, gangrenous ulcers, and aphthous or sloughy sore-throat, spongy or ulcerated condition of the gums, caries of the teeth, etc. It is sometimes combined with hydrastis and capsicum, in aphthæ, and with tincture of castor as an emmenagogue. The dose of Myrrh in powder or pill, is from ten grains to half a drachm; of the tincture, from half a fluidrachm to two fluidrachms.

Off. Prep.—Mistura Chenopodii Composita; Pulvis Nigrum; Pilulæ Copaibæ Compositæ; Tinctura Myrrhæ; Tinctura Myrrhæ Composita; Tinctura Aloes et Myrrhæ; Lotio Myrrhæ Compositæ.

BAPTISIA TINCTORIA.

Wild Indigo.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

BARK OF THE ROOT AND LEAVES.

Description.—Baptisia Tinctoria, also known as *Horse-fly Weed*, *Rattlebush*, etc., is a perennial plant, with a blackish and woody *root*, yellowish internally, and sending off many rootlets. The *stem* is two or three feet high, very much branched, round, smooth, and glaucous. The *leaves* are small, alternate, palmately trifoliate, subsessile; the *leaflets* are rounded at the extremity, cuneate at the base, and about three quarters of an inch long; *stipules* minute, deciduous. *Flowers* yellow, in small, loose, terminal, few-flowered racemes. *Calyx* subcampanulate, four-cleft, bilabiate the upper segment broader. Six, twelve, or more flowers in each raceme. *Vexillum* roundish, crenulate, reflexed on the sides; *wings* obovate; *keel* of two obovate petals, slightly united. *Stamens* ten, distinct, deciduous, nearly equal, as long as the keel; *filaments* slender, smooth; *anthers* small, oblong, incumbent. *Ovary* smooth, pedicellate, tapering into a slender style; *stigma* simple, minute. *Legume* short, inflated, bluish-black, gibbous, on a long stipe; *seeds* small, subreniform.—*L.*

History.—This is a small shrub, growing in dry places in many sections of the United States, occasionally in damp places. It flowers in July and August, having bright yellow flowers, in small loose clusters at the end of the branches. The fruit is an oblong pod, of a bluish-black color. It contains indigo, tannin, an acid, and baptisin. When the whole plant, or any portion of it, is dried, it becomes black, and yields a blue dye, inferior to indigo. In some parts of the country the young shoots are used in the place of asparagus, to which they bear some resemblance, and they occasionally cause drastic purgation, especially if used after they acquire a green color. Alcohol or water will take up its active properties. Both the root and leaves are medicinal, and deserve further investigation. The root is inodorous, and of a nauseous, somewhat acrid taste; its virtues appear to reside chiefly in the bark.

Properties and Uses.—Purgative, emetic, stimulant, astringent and antiseptic. Principally used on account of its antiseptic virtues. A decoction of the bark of the root is an excellent application as a wash or gargle to all species of ulcers, as malignant, ulcerous sore mouth and throat, mercurial sore mouth, scrofulous, or syphilitic ophthalmia, erysipelatous ulcers, gangrenous ulcers, sore nipples, etc.; or it may be made into an ointment for external application. As a poultice or fomentation it is highly useful in all ulcers, tumors, or inflammations tending to gangrene. In fetid leucorrhea, fetid discharges from the ears, etc., the decoction will be found efficient, if injected into the parts with a suitable syringe. The leaves applied in fomentations have discussed tumors and swelling of the female breast, resembling scirrhus.

Internally, it may be used in the form of a decoction or syrup, in scarlatina, typhus, and all cases where there is a tendency to putrescency. It acts powerfully on the glandular and nervous systems, increasing all the glandular secretions, and arousing the liver especially to a normal action; and is very efficient in the atonic varieties of acute rheumatism and pneumonia.

I make much use of the dried alcoholic extract of the root-bark in the low stage of typhoid, and typhoid conditions generally, in conjunction with leptandrin; and have used it extensively for the last 14 years, and with very excellent effect, in all diseases of a tuberculous character. I take pleasure in introducing to the profession, the active principle of this plant,—*Baptisin*, prepared similarly to Aletrin, or it may be precipitated by an acid, or by acetate of lead from the saturated tincture: I have found it to exert a powerful influence on the glandular system in doses of from one-fourth to one-half a grain; if given in large doses it produces a very disagreeable prostration of the whole system. It is also an excellent application to gangrenous and erysipelatous ulcerations, and malignant and fetid ulcerations of the cervix uteri. Combined with leptandrin, podophyllin, quinia, or cimicifugin, in diseases where these agents are indicated, it will be found valuable in typhus and typhoid fevers, and all diseases of a typhoid character, when administered internally.

Baptisin is of a yellowish-brown color, a strong odor, similar to that of the powdered root, and of a rather bitter, not very disagreeable taste, persistent in its character. It is insoluble in water, ether, the mineral acids, acetic acid, also in volatile oils, oil of turpentine, and chloroform, floating on the surface of this last. Ammonia added to it in water, causes it to be nearly completely dissolved, and gives a dense, light bluish-yellow solution. Liquor potassa likewise causes it to imperfectly dissolve in water, giving a dark-yellow precipitate, and a light-yellow saponaceous solution. It is partially soluble in alcohol, and on the addition of ammonia becomes entirely dissolved, but gives a precipitate on standing. Sulphuric acid turns it a dark yellowish-red color; nitric acid yellowish-green; and muriatic acid affects no change in its color.

Dose, of the decoction—made by boiling one ounce of the powdered bark in two pints of water, down to one pint—one tablespoonful every one, two, or four hours, as required—if it purge, produce nausea, or a disagreeable relaxation of the nervous system, lessen the dose, or omit its use entirely, for a time; of the hydro-alcoholic extract, one to four grains every two, three, or four hours.

The *Baptisia Alba*, or Prairie Indigo of the Western prairies, with the flowers white, may be substituted for the above.

Off. Prep.—Extractum Baptisiæ Hydro-Alcoholicum; Pilulæ Baptisiæ Compositæ; Unguentum Baptisiæ.

BAROSMA CRENATA. (*Diosma Crenata.*)

Buchu.

Nat. Ord.—Rutaceæ. *Sex Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—This plant is the Diosma Crenulata, D. Odorata, etc., of former botanists. It is a slender, smooth, upright, perennial shrub, between two and three feet in height, with twiggy, somewhat angular *branches*, of a brownish-purple color. The *leaves* are opposite, flat, spreading, about an inch long, ovate or obovate, acute, serrated, dotted, glandular at the edge. The *flowers* are pink, or whitish, terminal, solitary, on short, lateral, leafy branches. The *calyx* is five-cleft, dotted. *Corolla* five spreading petals, with short claws. *Stamens* five, subulate; *anthers* ovate; *ovaries* superior, top-shaped; *style* erect, as long as the petals; *stigma* simple, minute, five-lobed. *Capsule* ovate; *seeds* oblong, shining, black.—*De Cand.*—*L.*—*Hooker.*

History.—This plant, together with several others from which the leaves are obtained, as the *Barosma Crenulata*, *B. Serratifolia*, etc., are indigenous to Southern Africa, occupying a limited extent. The leaves are the officinal parts. According to Burchell they are odoriferous, and are, when powdered, used by the Hottentots under the name of *Bookoo* or *Buku*, for anointing their bodies. They likewise prepare a Buchu Brandy by distilling the leaves with wine, and which they employ as an efficient remedy in all affections of the stomach, bowels, and bladder; they also apply a decoction of the leaves to wounds.

As met with in commerce, the leaves are from nine to twelve lines long, from two to six lines in breadth, coriaceous, elliptical, lanceolate, slightly acute, or shorter and obtuse, especially those from the younger twigs; their margin is very finely serrated and glandular; their upper surface is smooth, of a clear shining green; the inferior paler, and beset with scattered glandular oil points, translucent when held between the eye and the light. They have a strong, penny-royal-like odor, and a corresponding taste, without heat, bitterness, or evident astringency, all of which qualities will serve to discriminate them from the leaves of senna. If they be preserved with ordinary care, their odor will remain for some years. The leaves of the *B. Serratifolia* are linear, lanceolate, acuminate, smooth, serrulated, glandular at the edges, three-nerved; those of the *B. Crenulata* are oval-lanceolate, about an inch long, minutely crenated, with a few obscure, oblique nerves, dotted with a pellucid oil-gland at every crenature. The leaves of the several species possess similar properties. Buchu leaves have been analyzed by Brandes and Cadet de Gassicourt. The latter found them to contain volatile oil 0.665, gum 21.17, extractive 5.17, chlorophylle 1.10, resin 2.151, lignin, etc., 69.744. Their virtues are chiefly due to the volatile oil and extractive, which they yield to alcohol, or water. The oil has a powerful penetrating odor; is yellowish-brown, and lighter than water.

Properties and Uses.—Buchu is an aromatic stimulant and tonic. It promotes the appetite, relieves nausea and flatulence, and acts as a diuretic and diaphoretic. It is principally used in chronic diseases of the urino-genital organs, as in cases of chronic inflammation of the mucous membrane of the bladder, irritable conditions of the urethra, in urinary discharges with increased deposit of uric acid, and in incontinence connected with diseased prostate. Some have found it beneficial in dyspeptic, cutaneous, and rheumatic affections. I do not, however, think it equal to many of our indigenous remedies, which are sadly neglected by the profession, in their eagerness for something at a distance from home. Were our native plants more closely investigated, there would be but little use for foreign, and consequently expensive agents. Under favorable circumstances a warm infusion of Buchu leaves will cause diaphoresis. Dose of the powder, from twenty to thirty grains, two or three times a day; of the infusion, two to four fluidounces, three or four timesa day of the tincture, one to two fluidrachms.

Off. Prep.—Extractum Barosmæ *vel* Buchu Fluidum; Infusum Barosmæ.

BENZOIN ODORIFERUM.

Spicewood.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

THE BARK AND BERRIES.

Description.—This is the *Laurus Benzoin* of Linnæus, and is also known as *Wild Allspice*, *Feverwood*, *Benjamin Bush*, etc.; it is a shrub growing from five to twelve feet in height, with obovate-lanceolate, veinless, entire, deciduous *leaves*, green on each side, and slightly pubescent beneath; *flowers* yellow, in little naked umbels on the naked branches, often diœciöus; *buds* and *pedicels* smooth; *fruit* the size of an olive, bright-red, in clusters, containing an ovate, pointed nut. *Calyx* six-cleft, with oblong segments.—*W.*

History.—This shrub grows in damp woods and shaded places, in the United States and Canada, bearing greenish-yellow flowers in April, and maturing its fruit, which consists of bright crimson-colored, ovoid berries, growing in small bunches, in the middle of Autumn. The whole plant has a pleasant, aromatic taste, owing chiefly to a volatile oil, and yields its virtues to boiling water, or proof-spirit.

Properties and Uses.—Aromatic, tonic, and stimulant. An infusion or decoction has been successfully used in the treatment of ague and typhoid forms of fever, also as an anthelmintic. The berries afford a stimulant oil, much esteemed as an application to bruises, chronic rheumatism, itch, etc., and has some reputation as a carminative in flatulence, flatulent colic, etc. The bark, in decoction, is said to be refrigerant and exhilarating, and exceedingly useful in all kinds of fever, for allaying excessive heat and uneasiness; a warm decoction is employed to produce diaphoresis. The decoction may be drank freely.

BENZOINUM.

Benzoin.

Nat. Ord.—Styracaceæ. *Sex. Syst.*—Decandria Monogynia.

CONCRETE BALSAMIC EXUDATION OF STYRAX BENZOIN.

Description.—Styrax Benzoin is a tree from fifty to seventy feet high, with round, tomentose *branches*. The *leaves* are alternate, petiolate, oblong, entire, acuminated, smooth above, tomentose beneath, a palm long; *petioles* round, striated, tomentose, very short, channeled. The *flowers* are on one side, in compound, axillary racemes, nearly the length of the leaves; *common footstalks* tomentose; *partial* alternate, spreading, tomentose. *Calyx* campanulate, very obscurely five-toothed, outwardly tomentose; above a line in depth. *Petals* five, linear, obtuse, outwardly gray with very fine down, four times longer than the calyx. *Stamens* ten *filaments* inserted into the receptacle, rather shorter than the petals, beneath connate into a cylinder of the length of the calyx, ciliated on the upper part below the anthers. *Anthers* linear, longitudinally adnate to the petals. *Ovary* superior, ovate, tomentose. *Style* filiform, longer than the stamens. *Fruit* a globose drupe, containing one or two nuts, angular, concave on one side, convex on the other.—*L.*

History.—This tree inhabits Sumatra, where it is cultivated; it is called *Benzoin Tree*, or *Benjamin Tree*, and furnishes the Benzoin of the shops. This resinous balsam is obtained by making incisions into the bark of trees six or seven years old, from which the balsam flows in the form of a thick, milky, resinous juice, which is allowed to remain for three months before it is collected, when new incisions are made. There are several varieties of Benzoin, the best of which are in tears of a whitish color, and agglutinated by a brown resiniform mass. The dingy, dark-reddish brown, or blackish specimens of Benzoin, which are more commonly met with, contain more foreign substances than the preceding variety.

Benzoin is firm, brittle, pulverizable, of an agreeable, balsamic odor when rubbed, and of a sweetish, balsamic, somewhat acrid taste. When pure, it is wholly soluble in alcohol or ether. Upon exposure to heat, Benzoin consumes with the discharge of a dense, irritating, white smoke, consisting of benzoic acid and a fragrant empyreumatized oil. In pulverizing Benzoin, it irritates the lining membrane of the nostrils, causing sternutation. Water added to its alcoholic solution, precipitates it, forming a white liquid, which has been used as a cosmetic under the name of virgin's milk. Benzoin has a specific gravity of about 1.068. It contains volatile oil, resin, a balsamic matter, aromatic extractive, with a large proportion of benzoic acid.

Properties and Uses.—Benzoin exerts a stimulating influence on the mucous tissues, and has been used to promote expectoration in chronic diseases of the air-passages. It is also stated to stimulate the sexual organs. It enters into the manufacture of elixir paregoric, and constitutes the basis of Turlington's and many other balsams, which exert a salutary influence in healing wounds; the tincture is also employed to form a coating over the adhesive preparation so well known as *Court Plaster.* The fumes or vapor inhaled into the lungs, has been strongly recommended in chronic pulmonary catarrhs, and old laryngeal inflammations. But principally used to prepare benzoic acid, to improve the taste and odor of other medicines, and in perfumery.

A preparation has been recently used with some degree of success in hemorrhages, called *Pagliari's Hœmostatic* or *Styptic.* It is made by boiling together for six hours in a glazed earthen vessel, alum one pound, tincture of Benzoin eight ounces, water ten pounds. As the water evaporates it must be constantly replaced by hot water, so as not to interrupt the ebullition, and stir the resinous mass round constantly. Then filter the fluid and keep in stoppered bottles. It is limpid, color of champagne, styptic in taste, and aromatic in odor. White resin has been successfully substituted for the benzoin. Every drop of this fluid poured into a glass containing human blood produces an instantaneous magma; and by increasing the proportion of the styptic to the quantity of the blood, a dense, homogeneous, blackish mass results. It is said to be useful in all arterial and venous hemorrhages. In applying it, lint and bandages should be used to prevent the coagula which form from being removed from the mouths of the vessels; an application of them for twenty-four or forty-eight hours is sufficient.

Off. Prep.—Acidum Benzoicum; Tinctura Benzoini Composita; Unguentum Benzoini.

BERBERIS VULGARIS.

Barberry.

Nat. Ord.—Berberidaceæ. *Sex. Syst.*—Hexandria Monogynia.

BARK AND BERRIES.

Description.—Berberis Vulgaris is an erect, deciduous shrub, from three to eight feet high, with long, bending branches which are dotted with triple spines. The *leaves* are obovate-oval, simple, closely serrulate, terminated by soft bristles, alternate, about two inches long and one-third as wide, petioled, in their primary state three-parted and spiny. The *flowers* are small, yellow, in clusters on lax, pendulous racemes. *Petals* entire. *Stamens* irritable, springing violently against the stigma when touched. *Fruit* bright red, oblong berries, in bunches, very acid.—*L.*—*W.*

History.—This shrub is found in the New England States, on the mountains of Pennsylvania and Virginia, among rocks, and in hard, gravelly soils; occasionally it is found in the West on rich grounds. It flowers in April and May, and ripens its fruit in June. *Berberina* is its active alkaline principle.

Properties and Uses.—Tonic and laxative. Used extensively by practitioners in the New England States, in all cases where tonics are indicated, also in jaundice, and chronic diarrhea and dysentery. The berries form an agreeable acidulous draught, useful as a refrigerant in fevers, also beneficial in dysentery, cholera-infantum, diarrhea, etc. The bark is bitter and astringent, and has been used with advantage as a tonic, and has proved efficacious in the treatment of jaundice. The bark of the root is the most active; a teaspoonful of the powder will act as a purgative. A decoction of the bark or berries, has been found of service as a wash or gargle in apthous sore-mouth, and in chronic ophthalmia.

BERBERINA.

THE ALKALINE PRINCIPLE OF BARBERRY.

Preparation.—An alcoholic extract of the *Berberis Vulgaris* is prepared, to which water is added. This throws down a pulverulent brown substance; the fluid is then poured off, and the substance dried; it is then treated with alcohol, which takes up the Berberine, leaving a small portion undissolved. By evaporating the alcohol the Berberine remains. It resembles an extract, and is of a brownish-yellow color, translucent, with the smell of the root, and a pure, bitter taste; it becomes soft in the air. It is soluble in alcohol. Berberine may be obtained in crystals.

Properties and Uses.—Tonic and laxative, operating similarly to a combination of rhei and hydrastis. Used in the same cases as the root. Dose, two to ten, or even twenty grains. This article is not sufficiently used by practitioners.

BETULA LENTA.

Black Birch.

Nat. Ord.—Betulaceæ. *Sex. Syst.*—Monœcia Polyandria.

BARK.

Description.—Betula Lenta, also known as *Cherry Birch*, *Sweet Birch*, *Mahogany Birch*, etc., is a large tree growing from fifty to seventy feet in height, with a diameter of from two to three feet. The *leaves* are cordate-ovate, acuminate, acutely and finely doubly serrate, hairy on the veins beneath, and on the petioles. *Fertile aments* erect, elliptical, thick, somewhat hairy; sterile aments two to three inches long, longer than the fertile, and not so thick; *lobes of the veiny scales* nearly equal, obtuse, diverging.—*W.*—*G.*

History.—This is a well known tree, growing in various parts of the United States. The trunk is invested with a dark-brown or reddish bark, which becomes rough in old trees, and has, together with the leaves, an aromatic flavor and taste, somewhat similar to Gaultheria Procumbens. The wood is of a reddish color, strong, compact, and takes a fine polish; it is much used in cabinet work. The cambium is used in the spring by boys, as a delicious morsel. The bark is the part used, and yields its properties to water.

Properties and Uses.—Gently stimulant, diaphoretic, and astringent. Used in warm infusion wherever a stimulating diaphoretic is required, also in diarrhea, dysentery, cholera-infantum, etc. In decoction or syrup, it forms an excellent tonic to restore the tone of the bowels, after an attack of dysentery. Said to have been useful in gravel, and female obstructions.

BIDENS BIPINNATA.

Spanish Needles.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

ROOT AND SEEDS.

Description.—Bidens Bipinnata is an annual plant, with a smooth, branched *stem* growing from one to four feet high; the *leaves* are bipinnately parted, nearly smooth, petioled; the *leaflets* are ovate-lanceolate, pinnatifid, mostly wedge-shaped at the base; *heads of flowers* on slender peduncles, each with three or four obscure, obovate, yellow rays; *outer involucre* of linear scales as long as the inner, and nearly as long as the short, pale, yellow rays; *achenia* long and slender, four-grooved and angled, nearly smooth, three or four-awned, which adhere to the dress and to the fleece of animals.—*G.*—*W.*

History.—This is a common plant, growing in waste places on dry soils, flowering from July to September, and found from Connecticut to Pennsylvania, and westward.

The *Bidens Frondosa*, common Beggar-Tick, has a smooth, branching, rather hairy *stem*, from two to six feet high; the *leaves* are three to five, divided; *leaflets* lanceolate, pointed, coarsely toothed, mostly stalked; *outer leafy involucre* much longer than the head, ciliate below; *rays* none; *flowers* in clusters at the end of the branches, yellow; *achenia* wedge-obovate, two-awned, the margins ciliate with upward bristles, except near the summit. This is a common, very troublesome weed, growing in moist, cultivated fields throughout the United States; the achenia, as in the other species, adhering by their retrorsely-barbed awns to clothes, etc. It flowers from July to September.—*G.*—*W.*

The *Bidens Connata* (Bidens tripartita), Cuckold's, or Swamp Beggar's Tick, has a smooth *stem*, four-furrowed, with opposite branches, and grows from one to three feet high. The *leaves* are lanceolate, opposite, serrate, acuminate, slightly connate at the base, the lower ones mostly trifid; the lateral divisions united at the base, and decurrent on the petiole; *scales of the outer involucre* longer than the head, leafy, mostly obtuse, scarcely ciliate; *rays* none; *achenia* narrowly wedge-form, two, three, or four-awned, and with downwardly-barbed margins. Flowers terminal, solitary, consisting only of the tubular, yellow florets, surrounded by a leafy involucre. This is likewise a common weed found in wet grounds, rich fields, swamps and ditches, from New England to Missouri. It flowers in August. The root and seeds of all these plants are employed medicinally, and may be used in decoction, infusion, or tincture.—*G.*—*W.*

Properties and Uses.—Emmenagogue and expectorant; the seeds in powder or tincture have been successfully used in amenorrhea, dysmenorrhea, and some other uterine derangements; and an infusion of the root has proved beneficial in severe cough. The *Bidens Connata* has likewise been recommended in the above affections, also in palpitation of the heart, in which the infusion or decoction, drank freely through the day, has been found effectual. The *Bidens Frondosa* in infusion has cured several severe cases of croup, even where they have been considered beyond aid. A strong infusion of the plant, sweetened with honey, was administered to the children, warm, in doses of a tablespoonful or more every ten or fifteen minutes, until it vomited. A quantity of mucous and membranous shreds were ejected, followed by immediate relief; the children passed into a sleep, from which they awakened perfectly well. In a few hours after the emetic operation of the warm infusion, it acted as a cathartic. The leaves from which the infusion was made, were, at the same time, placed in a piece of flannel with some brandy added to them, and laid over the chest and throat. This plan is also beneficial in colds, acute bronchial and laryngeal attacks from exposures to cold, etc. An infusion of the seeds formed into a syrup with honey, is useful in hooping-cough.

BISMUTHI SUBNITRAS.

Subnitrate of Bismuth.

Preparation.—Take of Bismuth, in small pieces, and free from arsenic or other impurities, *one ounce*, and gradually add it to a mixture of Nitric Acid *one fluidounce and a half*, and Distilled Water a *fluidounce.* Favor the solution with a gentle sand-heat. When the Bismuth is all dissolved, pour off the solution, and add to it *three pints* of Distilled Water, and set the whole aside till the white crystalline powder settles; pour off the liquid, wash the Trisnitrate of Bismuth with Distilled Water, and dry it in the sun, or with a gentle heat.—*Lond.* Four parts of nitric acid sp. gr. 1.20, will dissolve about one part of bismuth. Most of the metal may be dissolved without the application of heat, and thus a waste of acid be prevented ; and only when there is no more action in the cold, must heat be resorted to. If the metal be not added gradually, the action will be so violent as to fracture the flask, or cause the acid to boil over ; and at the same time a basic salt will be formed, especially when the acid is partially saturated, which can with difficulty be redissolved.

Concentrated nitric acid attacks bismuth with great violence, a vast quantity of red nitrous gas is emitted, the metal is converted into a white oxide, much heat is evolved, and sometimes, it is said, even sparks of fire. When the acid is diluted, the action is less violent, and the oxide of bismuth is dissolved by the nitric acid remaining in the solution which has not undergone decomposition. The solution is colorless, and on cooling lets fall white crystals of oblique rhomboidal prisms, generally attached to each other in the form of stars, or the ternitrate of bismuth. When a large quantity of water is added to the clear solution, the ternitrate is decomposed, the subnitrate or trisnitrate of bismuth precipitating in very fine white, silky acicular crystals, while the supernitrate of bismuth remains in solution.

History.—Subnitrate of Bismuth, known also by the names *Trisnitrate of Bismuth*, and *White Oxide of Bismuth*, is a white, heavy powder, nearly tasteless; odorless, insoluble in water, but quite soluble in nitric acid without effervescence. Hydrosulphuric acid, or the hydrosulphurets blacken it; light also darkens it when it contains a portion of silver, or when in a moist state it is placed in contact with paper, or other organic substance. Under the blowpipe it gives out nitrous acid, and is reduced to the yellow oxide of bismuth, and if the heat be continued globules of metallic bismuth are obtained. Its formula is $Bi\ O_3\ NO_5\ HO$, and its equivalent weight 300.

If any carbonate be present it effervesces in solution with nitric acid; if lead be present, diluted sulphuric acid gives a white precipitate with the solution in nitric acid. This preparation of bismuth was formerly known by the names of *pearl white*, and *magistery of bismuth*. *Arsenic*, which may sometimes be present, is best detected by Marsh's test.

Properties and Uses.—The Trisnitrate of Bismuth has a very soothing influence upon irritated mucous surfaces, or when these are in a state of chronic inflammation, and on this account it is very useful in some forms of dyspepsia, chronic gastritis, heartburn, gastrodynia, waterbrash, colliquative diarrhea, etc. In chronic diarrhea it has been found serviceable in doses of ten or twenty grains every hour or two; in the diarrhea attending typhus and phthisis, five grains of the Subnitrate combined with three grains, each, of magnesia and gum Arabic, has proved efficacious—the dose to be repeated every four or six hours. In a long standing case of chronic gastritis, accompanied with a harrassing cough, laryngitis, great debility, night-sweats, loss of appetite, looseness of the bowels, and a fiery red tongue, the following mixture proved very beneficial; take of fluid extract of cubebs one fluidounce, mucilage of gum Arabic two fluidounces, lupulin, Subnitrate of Bismuth, each, two drachms and two scruples, essence of lemon one fluidrachm; mix. The dose was a teaspoonful three or four times a day, shaking it thoroughly each time previous to its exhibition. Bismuth is sometimes added to pills as a tonic. The action of the gases in the bowels causes it to appear black in the stools. The dose of the Subnitrate is from five grains to half a drachm, two or three times a day, in powder, or mixed with mucilage. It has been considered a tonic and antispasmodic, but I doubt whether it possesses any such properties, though it may relieve spasm dependent upon an irritable condition of the mucous lining membrane of the stomach and alimentary canal, upon which, as before stated, it appears to exert a sedative influence. When given in over-doses, Subnitrate of Bismuth produces unpleasant symptoms, as pain in the stomach, sickness, emesis, derangement of the bowels, giddiness, insensibility, etc., for which the remedies are, albuminous and mucilaginous draughts, milk injections, and warm fomentations. Perhaps dilute nitric acid would also be useful. The granular, amorphous, hydrated oxide of bismuth must not be used in medicine; it may be known from the Subnitrate by the crystalline character of the latter, under the microscope.

Valerianate of bismuth a white, amorphous powder, with a strong valerian odor, has been highly recommended in dyspepsia with nervous irritability. It is made by dissolving pure metallic bismuth in nitric acid, saturating any excess of the acid with carbonate of soda, and then adding a solution of valerianate of soda to the bismuth solution, as long as any precipitate continues. Collect the powder on a filter, wash, and dry it.

BRAYERA ANTHELMINTICA.

Kousso. Cossoo.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Digynia.

THE FLOWERS.

Description.—This is a tree growing about twenty feet high, with round, rusty, tomentose-villose *branches*, marked by the annular cicatrices of the fallen leaves. The *leaves* are crowded, alternate, interruptedly imparipinnate, and sheathing at the base; *leaflets* oblong, or elliptical-lanceolate, acute, serrate, villose at the margin and on the nerves of the under surface. *Stipules* adnate to the petiole, which is dilated at the base, and amplexicaul. *Flowers* diœcious, small, greenish, and becoming purple; repeatedly dichotomous; the pedicels with an ovate bract at the base. The so-called male flowers may be regarded as hermaphrodite flowers, inasmuch as the carpels are well developed. The female flowers are somewhat different in their structure. The outer segments of the calyx are much more developed than in the female flowers, and are four or five times larger than those of the inner row, and are placed somewhat below them; the petals are entirely wanting; the stamina are rudimentary and sterile. The ripe fruits are unknown.—*Kunth.*

History.—This plant was introduced into notice by a pharmacien of Paris, and its properties as an anthelmintic were investigated by the Academy of Medicine, as early as 1847; who, with the Academy of Sciences, made a favorable report. It grows in Abyssinia, the flowers being the parts of the plant used; they are reduced to a fine powder, which is brownish, like jalap, bitter, somewhat nauseous, and an odor similar to scammony. The plant is named in honor to Dr. Brayer, who first made its virtues known in Europe. Bruce, in his travels, Vol. VII., appendix, gives a minute description of the plant, and calls it, in testimony of esteem for a friend, "Banksia Abyssinica." Dr. Kirk, in the appendix to the second volume of the "Highlands of Ethiopia," by Sir W. C. Harris, calls it "Hagenia Abyssinica," and states "that a cold infusion of the dried flowers and capsules, constitutes the famous drasticum purgans and anthelminticum of the Abyssinians."

Properties and Uses.—Purgative and anthelmintic. Used by the Abyssinians for tapeworm, to which they are very subject, and it is said they will not travel without having some of the Kousso with them. The dose of the flowers in powder is a small handful, or about four drachms and a half, which is to be macerated in about three gills of lukewarm water for fifteen minutes. The infusion, with the powder suspended in it, is taken either in one, two or three doses, quickly following each other. It is recommended that lemon-juice, or tamarind water, should be taken freely before and after the Kousso. The patient must be prepared by low diet for one or two days previously, and by a dose of castor-oil, or other purgative, and the Kousso is to be taken on an empty stomach before breakfast. The clear infusion has the color, and a somewhat similar taste, to very weak senna tea. Its operation is safe, speedy, and most effectual, rarely causing any annoyance or uneasiness, except a slight nausea, and this but seldom; occasionally emesis takes place, or diuresis. A gentle cathartic after its operation is also advisable. As far as it has been used, it has not failed to kill and expel the worm.

BUXUS SEMPERVIRENS.

Box.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Tetrandria.

THE LEAVES.

Description.—Buxus Sempervirens is a small, dense-leaved, hard-wooded, evergreen tree. The *leaves* are ovate, opposite, deep shining, green, becoming red in the autumn, quite smooth and entire, with the cuticle of the underside readily stripping off; *petioles* and *young branches* slightly downy; *flowers* aggregate, axillary, pale-yellow. *Capsule* globular, three-horned, tricoccous, six-seeded, bursting elastically. *Seeds* parallel, oblong, slightly compressed, externally rounded.—*L.*

History.—This is an exotic though generally well-known plant, growing on dry chalky hills in Europe, and the west of Asia. One variety of it, the *B. Suffruticosa*, Dwarf-box, with obovate leaves, and a stem scarcely woody, and which is much esteemed for borders along the walks of gardens, possesses similar medical virtues. It is of very slow growth, a tree eight feet high must be one hundred years old. The wood is yellow, very hard, and much used by wood-engravers for wood-cuts, also for other purposes. The leaves, which are the parts used, are bitter and nauseous, and impart their properties to water or alcohol. The bark of box-tree was found by M. Fauré to contain 0.6 chlorophylle, 0.3 buff-colored matter, 1.4 wax, 1.1 azotized tallow, 4.0 resin, 14.1 extractive, 1.1 malate of buxina, 4.4 gum, 67.8 lignin, 5.2 ashes, containing sulphates of potassa and lime, carbonates of lime and magnesia, phosphate of lime, iron, and silica. *Buxina* was obtained by exhausting the powdered bark with alcohol, evaporating the liquid, dissolving the residue in water, and boiling the solution with ammonia. The precipitate thus obtained was digested in alcohol, which, being evaporated, left a dark-brown translucent mass, which is the buxina. It is bitter, causes sneezing, is insoluble in water, slightly so in ether, readily so in alcohol, and is difficult to obtain white, even when treated with animal charcoal. It restores the blue color of litmus, and forms neutral salts with acids. Nitric acid added to the sulphate of buxina, removes a resinous matter and leaves the sulphate of buxina pure; from this salt, pure buxina may be obtained in crystals.

Properties and Uses.—Cathartic, sudorific, alterative, and anthelmintic. It may be used in syrup or extract, in all diseases where an alterative is required; said to be an equivalent of Stillingia in syphilis, but I have used the plant somewhat extensively, and do not consider it near as effectual. In doses of ten or twenty grains of the powdered leaves, it proves an excellent vermifuge. The dose of a strong decoction or syrup, is from half a fluidounce to a fluidounce, three or four times a day. And in combination with the Stillingia and Corydalis, in the form of syrup, it forms one of the best antisyphilitic remedies known in practice. Reputed to possess antispasmodic virtues, and to have been beneficially used in epilepsy, chorea, hysteria, etc., but requires further corroboration. Chips of the wood are said to have the same properties, and have been prescribed in syphilitic diseases, and chronic rheumatism. A fetid empyreumatic oil, *oleum buxi* was formerly prepared, but the use of which has become superseded by the preparations of Guaiacum; it has, however, been successfully used in toothache. Camels who eat the leaves are said to become poisoned.

CALENDULA OFFICINALIS.

Garden Marygold.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Necessaria.

THE LEAVES AND FLOWERS.

Description.—Calendula Officinalis has a fibrous, annual *root*, with a *stem* about a foot high, having many patent dichotomous, or sometimes trichotomous branches, striated, green, succulent, hispido-pubescent. The *leaves* are alternate, oblong, acute, mucronate, sessile, somewhat succulent, broad, and a little cordate at the base, the margins quite entire, and often scabrous-ciliate. Flower-heads large, terminal, solitary upon each branch, of a rich, full golden yellow, deeper and brighter previous to their full expansion. *Involucre* of many nearly equal, appressed, linear-subulate, pilose-hispid leaves or scales, not one-third so long as the radiant florets, the apices a little recurved. *Achenia* carinate, muricate, incurved. *Corollas of the ray* ligulate, female tridentate, broadly linear, the lower tubular portion hairy. *Ovary* singularly boat-shaped, curved like a horse-shoe, large, green, downy within, having a thickened margin, more or less tuberculated on the back. *Florets of the center* all tubular, small, male, and consequently sterile; the mouth five-cleft, base hairy. *Abortive ovaries* cylindrical, downy, green. *Receptacle* dotted.—*L.*—*W.*

History.—This is a common garden herb, with a feeble, aromatic, not very unpleasant smell, and a salty, austere, rather disagreeable taste. The leaves and flowers are generally used, and impart their active properties to alcohol, or boiling water. *Calendulin* is obtained by digesting the flowers and leaves of marygold in alcohol, and then evaporating the solution to the consistence of an extract. This must first be digested in ether, which dissolves a substance analogous to wax, and afterward in water. The mucilaginous substance which remains is the calendulin. It is, when dried, yellowish, translucent and brittle; it swells up and forms mucilage with water; it dissolves in hot water, but assumes the form of jelly on cooling. It is insoluble in the diluted acids, alkaline carbonates, lime, ether, and the fixed and volatile oils; and soluble in concentrated acetic acid, dilute solutions of the caustic alkalies, and in absolute alcohol. It is not precipitated by infusion of nut-galls.

Properties and Uses.—Slightly stimulant and diaphoretic. Used for similar purposes with saffron, but less active. Has been reputed useful in spasmodic affections, strumous maladies, icterus, suppressed menstruation, typhoid febrile conditions, cancer, etc. Used in infusion, or in the form of extract, from four to six grains, three or four times a day; also applied locally to cancerous and other ulcers. Probably over-estimated. Dr. Wm. J. Clary, of Monroeville, Ohio, writes me as follows, in relation to this plant: "As a local remedy, after surgical operations, it has no equal in the Materia Medica. Its *forte* is its influence on lacerated wounds, without regard to the general health of the patient or the weather. If applied constantly, gangrene will not follow, and I might say there will be but little, if any danger of tetanus. When applied to a wound, it is seldom that any suppuration follows, the wound healing by replacement or first intention. It has been tested by several practitioners, and by one, is used after every surgical operation with the happiest effect. You need not fear to use it in wounds, and I would not be without it, for a hundred times its cost. It is to be made into a saturated tincture with whisky diluted with one-third its quantity of water; lint is saturated with this, applied to the parts, and renewed as often as it becomes dry."

CALLITRICHE VERNA.

Water-Starwort.

Nat. Ord.—Callitrichaceæ. *Sex. Syst.*—Monandria Digynia.

THE HERB.

Description.—This plant, also known by the name *Water-chickweed*, is a small aquatic annual herb, which floats upon the water, its *stem* being a foot or two in length, and composed of two tubes, simple or branched;

the *leaves* are opposite, three-nerved, the upper ones oblong-spatulate, two at each node, crowded above into a star-like tuft upon the surface of the water, the lower ones becoming gradually narrower, and the lowest quite linear, obtuse or emarginate. The *flowers* are very minute, white, axillary, solitary, or in pairs, and often monœcious; *anther* a little exserted, yellow; *styles* constantly erect; *fruit* nut-like, indehiscent, one-celled, four-seeded; *seeds* peltate, albuminous.—*W.*

History.—This plant is common to the United States, growing in shallow streams and muddy places, and flowering from April to September. The whole plant is used; it yields its properties to water, or alcohol. There are several varieties, as *C. autumnalis*, *C. terrestris*, *C. heterophylla*, all of which possess similar medicinal virtues.

Properties and Uses.—This plant is a very valuable diuretic, and has been found advantageous in some affections of the kidneys and bladder, dropsy, and gonorrhea. A decoction of it may be drank freely, according to its diuretic influence. In dropsy a tincture made with spirits is preferred. The plant deserves more attention than it has heretofore received.

CALX.

Lime.

Preparation.—Lime does not exist in the pure or caustic state in nature, but is procured by heating a natural Carbonate of Lime, by which process its carbonic acid is set free, while the lime is left in the residue. It is found purest in limestone, chalk, marble, and the shells of oysters. That procured from the last two, is quite pure, and especially suited for delicate investigations in the chemical laboratory. The Edinburgh College orders White Marble, broken into small fragments, to be heated "in a covered crucible at a full red heat for three hours, or till the residuum, when slaked and suspended in water, no longer effervesces on the addition of Muriatic Acid." After the lime has become cool, it should be at once secured in well-closed vessels, to prevent it from absorbing carbonic acid from the atmosphere, which it does very speedily.

History.—Lime, when pure, is a white or grayish solid, moderately hard, but easily reduced to powder, and having a specific gravity of about 3.08. It has a hot, burning, alkaline taste, in some measure corrodes and destroys animal tissues, reacts powerfully on vegetable colors as an alkali, and is difficult of fusion, requiring the oxy-hydrogen flame to both fuse and volatilize it. In contact with the atmosphere, it attracts water and carbonic acid, and is converted into a hydrated carbonate. A pint of water at 32° F. dissolves 13.25 grains of lime; at 212° F., it dissolves only 6.7 grains. The dense fluid, termed *Milk of Lime*, is slaked-lime suspended in lime-water. When water is added to lime, this swells up, cracks, and becomes reduced to powder, with the evolution of a considerable degree of heat; in this state it is called *slaked-lime* (*calx extincta*), or the *hydrate of lime* (*calcis hydras*). It is white, pulverulent, much less caustic than lime, and is principally used for preparing chlorinated lime.

In 1808 Davy showed that lime was an oxide of calcium, $Ca\,O = 28$, consisting of one atom of calcium, $Ca = 20$, and one of oxygen, $O = 8$. Lime is soluble in hydrochloric acid without effervescence, and the solution gives no precipitate with ammonia. Lime-water reddens yellow turmeric paper; turns infusion of red cabbage green; is rendered milky on the addition of carbonic acid; forms a white precipitate with oxalic acid or an oxalate; and gives no precipitate with sulphuric acid. "It enters very readily into combination with all the acids, sulphur and phosphorus; and decomposes the alkaline carbonates, phosphates, fluates, borates, oxalates, tartrates, and citrates; the ammoniacal acetates, muriates, and succinates, the sulphates of alumina and magnesia, the metallic salts, spirituous liquors, and astringent substances."—*Coxe.* Consequently the above are *incompatibles.*

Properties and Uses.—For its internal employment, see *Aqua Calcis.* Externally, it is a powerful escharotic. *Potassa cum Calce,* a powerful caustic, for cauterizing the neck of the uterus, or other parts, and also known as *Vienna powder* or *paste,* is made by reducing caustic potassa one ounce and a half, and quicklime two ounces, each separately, to powder in a heated mortar; then mix them carefully and rapidly, and keep the mixture in a wide-mouthed bottle with a ground stopper. In using this caustic, the powder must be moistened with a little alcohol, so as to reduce it to a soft paste, which is to be applied to the part to be cauterized. In this case, the potassa only acts upon a circumscribed portion of skin, instead of spreading, as common caustic potassa generally does; but to bound the space still more accurately, it may be surrounded by a ring of diachylon plaster. Dr. Filhos has prepared a caustic of the same agents, which is more easily used; it is called the *Caustic of Filhos.* It is made by fusing together six ounces of caustic potassa, and three ounces of quicklime; the mixture is poured into leaden cylinders inclosed in glass tubes, and which are to be sealed afterward at each end.

In cases where diaphoresis is desirable, without disturbing the patient, it may be effected as follows: Take a piece of Lime about the size of a Sicily orange, wrap around it a wet rag, but not too wet. Around this wrap several thicknesses of dry muslin or cloth. Place one thus prepared on each side of the patient, and by both thighs; it will soon induce copious perspiration.

Off. Prep.—Aqua Calcis; Liquor Calcis; Potassa cum Calce.

CAMPHORA.

Camphor.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

Description.—Laurus Camphora is a large tree with lax, smooth branches. The *leaves* are evergreen, alternate, on long, slender, smooth petioles, somewhat coriaceous, oval, acuminate, attenuate at the base, bright-green and shining above, paler beneath, triple-nerved, with a sunken gland at the axils of the principal veins, projecting at the upper side, opening by an oval pore beneath. *Flowers* small, smooth, yellowish-white, in axillary and terminal, naked corymbose panicles. *Leaf-buds* scaly. *Fertile stamens* nine in three rows; the inner with two, compressed, stalked glands at the base; *anthers* four-celled; the outer turned inward, the inner outward. Three *sterile stamens* placed in a whorl alternating with the stamens of the second row; three others stalked, with an ovate glandular head. *Fruit* placed on the obconical base of the calyx.—*L.*

History.—Camphor is obtained from the Laurus Camphora of Linnæus, or Camphor Officinarum of Nees, which, in the crude state, is imported into this country, principally from Canton, where it undergoes purification by sublimation, before it is in a state adapted to medical use. The Camphor-tree inhabits the Eastern and warmer latitudes of Asia. It is an aromatic tree, all parts of it yielding the odor of Camphor. Camphor is obtained in Japan by cutting the wood, roots, etc., of the tree in small pieces, boiling them in water, in large iron stills fitted with earthen heads, containing straw cones. The water is kept boiling for about forty-eight hours, the Camphor sublimes and concretes upon the straw in the head, in the form of a grey powder. The Chinese pursue a different process; they steep the chopped branches in water, then boil it, continuing the ebullition until a stick placed in the fluid will, when cooled, be covered with the Camphor. The liquid is then strained, and by cooling the Camphor solidifies. This is then placed alternately in layers, with powdered dry earth, in a copper vessel, over which another one is placed; and the Camphor being sublimed by heat, attaches itself to the upper inverted vessel. It is of a dirty grayish color, and is known as impure or crude Camphor.

Camphor is very white, pellucid, somewhat unctuous to the touch, brittle, yet tough and elastic, so as to be scarcely pulverizable; shining in its fracture, and crystalline in its texture; of a bitterish, aromatic, pungent taste, yet accompanied with a sense of coolness; of a strong and very penetrating smell; very volatile, burning entirely away, without leaving any coal or ashes.—*Ed.* It can not be pulverized alone, but is easily so by the aid of a few drops of alcohol. It slowly evaporates when exposed to the air, and is soluble in alcohol, ether, fixed and volatile oils, and acetic, nitric, and sulphuric acids. Nitric acid converts it into Camphoric Acid and Oil of Camphor; sulphuric, into artificial tannin and charcoal. Resins and fats, when heated with it, unite in all proportions. By the application of polarized light, the smallest portion of natural Camphor may be distinguished from the artificial Camphor (Hydrochlorate of Camphene). If small fragments of each be placed separately on glass slides, and a drop of alcohol added to each, they dissolve and speedily re-crystallize. If the crystallization of the natural Camphor is watched by means of the microscope and polarized light, a most beautiful display of *colored* crystals is seen, while with the artificial Camphor nothing of the kind is witnessed. Camphor is lighter than water, and keeps up a constant rotatory motion when small pieces are placed on that fluid. It volatilizes at ordinary temperatures, melts at 288°, and boils at 400°. Dumas has suggested that Camphor may be regarded as the oxide of a hypothetical base, *Camphogene*, and whose composition is $C_{10}\ H_8$. Camphor is found in many vegetables in small quantity; it is camphene with one equivalent of oxygen $C_{10}\ H_8\ O$; Camphoric Acid is camphene with four equivalents of oxygen; and artificial Camphor, or hydrochlorate of camphene, is camphene saturated with half an equivalent of hydrochloric acid. With bromine, Camphor forms garnet-red crystals, $C_{10}\ H_8\ O+Br$.

When Camphor is triturated with dragon's blood, guaiacum, galbanum, or assafetida, the mixture preserves the pilular consistence indefinitely. With benzoin, tolu, mastic, and ammoniac, the mixture becomes soft when exposed to the air. With olibanum, gamboge, euphorbium, amber, and myrrh, the mixture remains pulverulent, though grumous. Assafetida, galbanum, sagapenum, tolu, dragon's blood, olibanum, mastic, benzoin, tacamahac, guaiacum, and ammoniac, destroy to a greater or less extent the odor of Camphor.—*M. Planche.*

Properties and Uses.—In large doses Camphor is a narcotic and irritant; in small ones, sedative, anodyne, antispasmodic, diaphoretic, and anthelmintic. It exerts an influence on the brain and nervous system, is an excitant to the vascular system, and irritates mucous tissues which are in proximity with it. It is used to allay nervous excitement, subdue pain, arrest spasm, and sometimes to induce sleep. In the delirium, watchfulness, tremors, and starting of the tendons in typhoid conditions, it is of much utility as a nervo-stimulant. In inflammatory affections, as remittent and intermittent fevers, acute rheumatism, etc., it acts beneficially as a diaphoretic and sedative; and is also valuable in gout, neuralgia, dysmenorrhea, after-pains, puerperal convulsions, and painful diseases of the urinary organs, acting as a sedative, anodyne, and antispasmodic. It is often advantageously combined with opium in chordee, and hysteric nymphomania, and all irritations of the sexual organs. By some physicians it is said to act as an aphrodisiac, exciting the reproductive organs, causing considerable heat in the urethra, and nocturnal emissions; others, again, use it as an antaphrodisiac, and to diminish urino-genital irritation. It is said to be an antidote to poisoning by strychnia. An oleaginous injection of Camphor in the early stage of gonorrhea, often allays urethral irritation, as well as the tenesmus caused by thread-worms, flux, etc., when injected into the rectum. It enters into many embrocations and liniments for rheumatic, neuralgic, and deep-seated pains, cynanche tonsillaris, contusions from blows, sprains, chilblains, chronic cutaneous diseases, and as a stimulant for indolent and gangrenous ulcers. It has been found beneficial in asthma and spasmodic cough; and the powder may be used as a snuff for the relief of nervous headache, and catarrh in its commencing stage. The best form of using this agent is the Aqua Camphoræ. The administration of opium will best neutralize the evil effects of an overdose of Camphor. Dose of the powder, one to ten grains. When given in the solid form, it is capable of producing ulceration of the gastric mucous membrane.*

Off. Prep.—Aqua Camphoræ; Emplastrum Plumbi Compositum; Emplastrum Resinæ Compositum; Emplastrum Calefaciens; Linimentum Camphori Compositum; Linimentum Saponis Camphoratum; Linimentum Olei Compositum; Linimentum Capsici Compositum; Linimentum Opii; Mistura Camphoræ Composita; Mistura Copaibæ Composita; Pulvis Ipecacuanhæ et Opii; Pilulæ Camphoræ Compositæ; Pulvis Camphoræ Compositus; Tinctura Camphoræ; Tinctura Camphoræ Composita; Tinctura Serpentariæ Composita; Tinctura Opii Acetata; Unguentum Plumbi Compositum.

CANELLA ALBA.

Canella.

Nat. Ord.—Meliaceæ or Canelleæ. *Sex. Syst.*—Dodecandria Monogynia.

BARK.

Description.—Canella Alba is a straight tree from twenty to fifty feet high, with erect branches at the summit only. Its bark is yellowish-white; the *inner bark* is thick, smooth, pale, with a biting, aromatic taste. The leaves are scattered, shining, yellowish-green, obovate, cuneate at base, dotted when young, opaque when old, petioled. *Flowers* terminal, small, in clusters, purple; *petals* concave, erect, thick, deciduous. *Berry* the size of a pea, fleshy, smooth, blue or black, hot and biting while green; *seeds* generally two. *Stamens* combined in a tube; *anthers* fifteen, resembling furrows; *stigmas* three.—*L.*

History.—This is a South American tree; the bark is of a pale yellowish-white color, occurring in quills or hard twisted pieces, with an acrid, peppery taste, an aromatic clove-like odor, and a short, white granular fracture. Alcohol extracts its properties, the tincture being of a yellow color, and becoming white when water is added. It pul-

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* *Raspail's Eau Sedative* is made as follows; three strengths being indicated:

	No. 1.	No. 2.	No. 3.
Take of Solution of Ammonia (22°)	60 parts,	80 parts,	100 parts.
Tincture of Camphor,	10 "	10 "	10 "
Common Salt,	60 "	60 "	60 "
Water,	1000 "	1000 "	1000 "

Dissolve the Common Salt in the Water, then mix the Camphor and Ammonia together, and add them to the Saline solution. It is employed in hemicrania, cerebral congestion, and rheumatic affections, and is applied by compresses to the affected part; and when near the eyes care should be taken to protect them. No. 1 is for persons whose skins are easily irritated, No 2 for allaying the pain from stings of insects, and No. 3 for persons having a hard and callous skin.

verizes readily, yielding a powder of a pale yellow color. When distilled with water an essential oil may be had, of a dark yellowish color, having a powerful aroma and intense acridity; a pound of the bark yields about a drachm of oil. Analysis has discovered in it an oil lighter than water, an oil heavier than water, gum, starch, canellin, bitter extractive, resin, albumen, and various saline substances.—*P.*—*C.*—*T.*

Properties and Uses.—Canella bark is an aromatic stimulant and tonic, useful in enfeebled conditions of the stomach and alimentary canal. It is generally used in conjunction with other tonics. It is employed in the West Indies as a spice, and has been advised in scurvy. Some smokers add this bark to their smoking-tobacco to remove the unpleasant odor from the tobacco, and to impart a degree of fragrance to their smoking-rooms.

CANNA.

Canna Starch.

History.—Canna Starch, also known by the name of "*Tous les Mois,*" is obtained from a West Indian plant, supposed to be the *Canna Edulis* of Ker, the tubes or roots of which are rasped, and then subjected to the ordinary methods of washing, straining, decantation of the supernatant fluid, and drying of the deposited Starch. Canna Starch is imported from St. Kitts, and is an excellent arrow-root. It looks more like potato-starch than any other amylaceous substance, has a satiny or glistening exterior, and its particles are large, varying in length from the 150th to the 400th of an inch. Examined by the compound microscope, they are oval or oblong, generally more or less ovate, have a very distinct nucleus or hilum, and fine, regular, uniform, concentric rings. The circular hilum is usually placed at the narrow extremity, and is very rarely double. The hilum and the body of the particle are frequently cracked. Tous les Mois contains about 16.74 per cent. of hygroscopic water, is very soluble in water, and yields a very tenacious jelly when boiled in this fluid.—*P.*

Properties and Uses.—Canna Starch forms a salutary and agreeable article of diet for invalids and children, and appears to be easily digested. It may be boiled the same as arrow-root, and used in the same cases. By many it is preferred to any other kind of arrow-root.

CANNABIS SATIVA.

Hemp.

Nat. Ord.—Urticaceæ or Cannabinaceæ. *Sex. Syst.*—Diœcia Pentandria.

THE DRIED TOPS AND RESIN.

Description.—Cannabis Sativa is a herbaceous annual, growing about three feet high, covered with a very fine, rough pubescence, scarcely visible to the naked eye. The *stem* is erect, branched, bright-green, angular. The *leaves* are alternate or opposite, on long, lax petioles, digitate, scabrous, with linear-lanceolate, sharply-serrated *leaflets*, tapering into a long, smooth, entire point; *stipules* subulate. *Flowers* in axillary clusters, with subulate bracts; the males lax and drooping, branched and leafless at the base; females erect, simple, and leafy at the base. *Calyx* of male, downy; of female, covered with short brownish glands. *Achenium* ovate, one-seeded; *seeds* roundish-ovate, slightly flattened, one or two lines long, without odor, of a sweetish, oleaginous, unpleasant taste, glossy, and grayish.—*L.*

History.—Hemp is indigenous to Persia and northern India, and is cultivated in many other countries. The Hemp of this country is identical with the Eastern plant in its botanical characters, but differs somewhat from it in its physical qualities, the India plant being more powerful in its effects on the system, and which is probably owing to the influence of climate, cultivation, etc. In the Eastern countries an infusion of hemp is much employed as an intoxicating drink, and for smoking. The alcoholic or resinous extract is the form employed in medicine; it is prepared from the dried plant after it has flowered, and which is termed *Gunjah.* This extract is prepared by the Messrs. Smith of Edinburgh, as follows: "Digest bruised Gunjah in successive quantities of warm Water, till the expressed water comes away colorless; and again for two days, at a moderate heat in a solution of Carbonate of Soda, in the proportion of one part of the salt to two of Gunjah. Coloring matter, chlorophylle, and inert concrete oil being thus removed, express and wash the residuum, dry it, and exhaust it by percolation with rectified spirit. Agitate with the tincture, Milk of Lime containing an ounce of Lime for every pound of Gunjah, and, after filtration, throw down the excess of lime by a little Sulphuric Acid. Agitate with the filtered liquor a little Animal Charcoal, which is afterward to be removed by filtration. Distill off most of the spirit, add to the residual tincture twice its weight of Water, in a porcelain basin, and let the remaining spirit evaporate gradually. Lastly, wash the resin with fresh water till it comes away neither acid nor bitter, and dry the resin in thin layers." This resin contains the taste and odor of the Gunjah, and its activity is not impaired when exposed in the air for eight hours to a temperature of 180° F. 100 lbs. of dry Gunjah yield about six or seven pounds of this extract.—*P.* The concrete resinous exudation of the plant is known in India by the name of *Churrus.*

Properties and Uses.—India Hemp is an anodyne, hypnotic, antispasmodic, and phrenic, producing sleep even where morphia has failed, and without impairing the appetite, repressing the secretions, or causing constipation like opium and its preparations; it frequently allays pain, and has been found of great benefit in hysteria, chorea, and other nervous affections. Its effects upon the system vary under different conditions, thus, it lessens pain, checks spasmodic action, improves the appetite, causes sleep, exhilaration of spirits, and in increased doses, inebriation with phantasms, catalepsy, illusory delirium, and strong aphrodisia. It has been efficacious in delirium tremens, wakefulness in fevers, neuralgia, gout, rheumatism, infantile convulsions, low mental conditions, insanity, etc. Its internal use will likewise occasion dilatation of the pupil; and is said, in many cases to increase the strength of the uterine contractions during parturition, without the unpleasant consequences of ergot, and for which purpose it should be used in the form of tincture, thirty drops in sweetened water or mucilage, as often as required. In menorrhagia, the tincture in doses of five or ten drops, three or four times a day, has checked the discharge in 24 or 48 hours. It may likewise be beneficially combined with the tincture of cotton-bark, in the above uterine conditions. The tincture is made by dissolving twenty-four grains of the resinous extract in a fluidounce of rectified spirit; for ordinary purposes, its dose is from ten to thirty drops. The extract varies in strength; when well prepared, the dose is from half a grain to a grain; but this may vary from a grain to twenty grains depending entirely on the quality of the article. Very large doses have produced symptoms of a fearful character.—*P.*—*C.* The following is said to be a certain cure for gonorrhea: take, while in blossom, equal parts of tops of the male and female Hemp, *Cannabis Sativa*, bruise them in a mortar, and express the juice, to this add an equal portion of Alcohol. Dose, from one to three drops every two or three hours. The green plant collected in the spring, and two or three twigs placed in or between beds, will, it is asserted, certainly and effectually cause bedbugs to remove from the room in which they are used.

CANTHARIS VESICATORIA.

Cantharides.

The Spanish-fly belongs to *Class* Insecta, *Order* Coleoptera.

Gen. Ch.—*Antennæ* elongate, simple, filiform; *maxillary palpi* with terminal joint somewhat ovate; *head* large, heart-shaped; *thorax* small, rather quadrate, narrower than the *elytra*, which are as long as the abdomen, soft, linear, the apex slightly gaping; *wings* two, ample.—*J. F. Stephens.*

History.—There are a number of insects inhabiting various sections of the world which possess acrid properties, and which, when applied to the skin produce vesication; the most common in use are those under present consideration, Spanish-Flies, or Cantharides, the *Cantharis Vesicatoria* of Latreille, *Meloë Vesicatorius* of Linnæus, or *Lytta Vesicatoria*, and *Cantharis officinalis* of other naturalists. At what period they were introduced into the practice of medicine is a matter of uncertainty. The Spanish-fly is a native of Europe, and is imported into this country from Messina and St. Petersburg. Those from Russia are the best, and may be known by being larger than the French or English varieties, and more copper-colored. This insect may be distinguished from other analogous ones, by presenting two shining green wing-covers, which cover two membranous wings, ample, thin, veined, transparent, pale-brown; black, jointed antennæ, and a longitudinal furrow along the head and chest.—*C.*

The Spanish-fly is of an elongated almost cylindrical *form*, from six to eleven lines in *length* and one or two lines in *breadth*. It has a nauseous, unpleasant *odor*, a brass or copper-green *color*, with numerous whitish-gray hairs on its *body* and *thorax*. The *head* is large, subcordate; the *eyes* lateral, dark brown; *thorax* not larger than the head, narrowed at the base; *elytra* or *wing-covers* from four to six lines long, and from three-fourths to one and a half lines broad; *costa* slightly margined; *wings* two, tips folded; *legs* stout, from four to six lines long, the hinder ones longest; *abdomen* soft, broadest in the female. In the female, near the anus, are two articulated caudal appendages.—*P.* In the form of larva it inhabits the earth, and comes forth in the state of fly in the month of May, infesting various trees. It is found on the elder, rose, plum, willow, poplar and elm, but more especially on the privet, lilac, ash, and honeysuckle. They are caught during the month of May, either early in the morning, or late at night, when the cold renders them less active; to undertake their removal in the daytime would be a serious measure. Those who gather them cover their faces, and guard their hands with gloves, then shake them from the bushes over sheets, and kill them immediately by immersion in vinegar, or by exposure to the vapor of vinegar, spirit, or oil of turpentine. They are then quickly dried in the sun, or with artificial heat. The Spanish-fly is found more abundantly in the Southern parts of Europe.—*C.* Their smell is strong, virose, very disagreeable, and compared to that of mice; their taste is acrid, burning, and urinous.—*Ed.*

In the dried state the flies may be known by the preceding description as to color, form, odor, and taste; they are easily reduced to a dirty grayish-brown powder, dotted with numerous brilliant green points. These points consist of the elytra, head, etc., and do not readily decompose, even when mixed with decaying animal matters. Orfila has recognized these particles in a body nine months after interment. The vesicating property of the flies may be preserved for many years, if they are kept from moisture in well-stoppered bottles, powdering them only as required. If purchased in powder they may have lost their activity, or suffered from adulteration with euphorbium, or some other insects. To preserve them from insects, various means have been advised, as the introduction of a few lumps of camphor into the vessel containing them, or the addition of carbonate of ammonia, or a few drops of strong acetic acid. Exposing them for half an hour in glass bottles, to the heat of boiling water, destroys the insects and eggs, without impairing the virtues of the flies; of course they must not be allowed to come in contact with the water. The properties of the fly are much diminished by the insects which feed upon them.

Cantharides powder yields its active properties to boiling water, acetic acid, alcohol, proof-spirit, ether, the fixed and volatile oils. The active principle is a white, crystalline substance, termed *Cantharidin.* It is in small, white, pearly prisms, which are neutral, insoluble in water and cold alcohol, but soluble in ether, chloroform, alkaline solutions, acetic acid, the oils, and in boiling alcohol which deposits it upon cooling; it fuses at 210°, volatilizes at a higher heat without decomposition, and evaporates slowly at atmospheric temperatures. It is said to exist principally in the trunk and soft parts of the body, and may be obtained by exhausting powdered Cantharides with cold rectified spirit, by percolation, concentrating the tincture till most of the alcohol is expelled, and allowing the residue to rest for a long time until crystals form. It may be freed from impurities by elutriation with a little cold rectified spirit, which scarcely acts on crystallized cantharidin; and it may be obtained quite pure by re-dissolving them in boiling rectified spirit, adding animal charcoal, and re-crystallizing them by rest and cooling. Ether is, however, preferred to alcohol in preparing these crystals, as it dissolves less of the green oil, which is very difficult to separate. The composition of cantharidin is carbon 61.68 per cent., hydrogen 6.04, and oxygen 32.28, or $C_{10} H_6 O_4$.

Cantharides contain cantharidin, a *green oil* soluble in alcohol, *black matter* soluble in water, insoluble in alcohol, a *fatty matter* insoluble in alcohol, a *yellow viscid substance* soluble in water and alcohol, *yellow matter* soluble in ether and alcohol, free *acetic* and *uric* acids, phosphates of lime and magnesia, etc.—*P.* Although cantharidin is insoluble in water and cold alcohol, yet the decoction and tincture of Cantharides possess the active properties of the insect, which is owing to the presence of the yellow matter combined with it. The best menstruum for Cantharides is chloroform, or ether, which dissolves only the active constituents.

Properties and Uses.—In large doses, narcotic and irritant; in medicinal doses, stimulant and diuretic. In large doses, its use is dangerous, being attended often by violent inflammation of the alimentary canal and urinary organs, strangury, irritation of the sexual organs, in the female, abortion; also, headache, delirium, convulsions, and coma. Twenty-four grains of the powder or one ounce of the tincture have produced alarming symptoms. There is no known antidote to its poisonous effects, which must be treated on general principles. Medicinally, they are sometimes given in chronic gonorrhea, gleet, leucorrhea, seminal weakness, paralysis and chronic inflammation of the bladder. They have also been reputed useful in the anasarcous swellings succeeding scarlatina, diabetes, scaly cutaneous eruptions, chronic eczema, incontinence of urine, amenorrhea, etc. Thirty drops of solution of potassa, given every hour, is said to be an effectual remedy in cantharidal strangury. Dose, of powdered cantharides, half a grain to two grains. (*See Tinctura Cantharidis.*)

Externally, Cantharides cause redness, vesication, suppuration or sloughing, according to the length of contact with the integuments. Their most general use is to produce vesication. Blisters are sometimes beneficial in tic-doloreux, sciatica, local chronic inflammations, diseases of the brain, chest and abdomen, to excite the languid action of vessels, in recession of exanthematous affections, and to rouse from general defective sensibility, as in typhoid fever. In their application to children, much care should be observed, especially in typhoid conditions, exanthema, and where a tendency to sloughing exists. A piece of white paper soaked with the *Cantharidin*, which is greenish and liquid, laid on the part, and covered with a compress, and confined by means of a bandage, will vesicate in three or four hours. A vesicating oil has been recommended by E. Dupuy, prepared as follows: To one part of pulverized Cantharides add in a close vessel, a mixture of chloroform and castor-oil, of each, by weight, one and a half parts; after some hours, transfer the ingredients to a glass apparatus, and displace the liquid in the usual way; it will amount to about two-thirds of the original bulk of the liquid employed. A few drops of this vesicating oil applied to the arm of an adult will produce a perfect blister in about eight hours. It is easy of application on any surface, holds the vesicating agent free from the disagreeable concomitants of the ordinary fly-blister, and retains the Cantharides in a soluble state. Its action will probably be favored by the use of oil-silk over the application of it to the skin.

Off. Prep.—Tinctura Cantharidis; Emplastrum Cantharidis.

CANTHARIS VITTATA.

Potato Fly.

Description.—The Potato Fly is common to this country, being found principally below 39° N. latitude; it appears in July and August, and feeds upon the potato plant. Some seasons the Fly exists in great numbers. It resembles the Spanish-fly, though somewhat smaller, generally not exceeding half an inch in length. "The head is a very light red, with black antennæ; the elytra or wing-cases are black, margined with pale yellow, and a stripe of the same color extends along the middle of them; the tarsi have five articulations; the mouth is armed with jaws, and furnished with tarsi."—*Coxe.* Its abdomen is ash-colored, and in its cavity is a hard, white substance, about the size of a grain of wheat, which, when powdered, appears like meal, and forms a milky emulsion with water. The Fly inhabits the soil at the foot of the plant, ascending the vine in the morning and afternoon, but avoiding the heat of the sun at noon. As they fly with great difficulty, they are easily caught, and are prepared for medicinal purposes, by shaking them from the plant into hot water, and afterward drying them by the sun's rays.—*Coxe.*

History.—The Potato Fly, though not so much employed as the Spanish-Fly, is an excellent substitute for it; indeed, its effects are found to take place more promptly than with the foreign insect, which is probably due to its more recent state.

There are several other species of blistering fly in the United States, which are probably not at all inferior to cantharides, as the *Cantharis Cinerea*, *C. Atrata*, and *C. Marginata*, etc.

Properties and Uses.—These insects may be used in all cases as substitutes for the Spanish-Fly, as the property they all possess of blistering the skin, when in contact with it, is due to the same constituent. The doses will also be the same.

CAOUTCHOUC.

Gum Elastic. India-rubber.

Nat. Ord.—Euphorbiaceæ. Urticaceæ. *Sex. Syst.*—Monœcia Syngenesia.

THE GUM.

Description.—The tree (*Ficus Elastica*) from which Caoutchouc is obtained has a trunk from two feet to two and a half in diameter, and from forty to sixty feet high. The *leaves* are alternate, approximated, three-foliolate, articulated at the top of a long slender stalk, convex below, furrowed above, and swelled at its base; *leaflets* smooth, oval, acute, green above, cinereous beneath. *Flowers* monœcious. *Calyx* five-cleft. *Fruit* oblong, greenish, three-cornered, broadest at base, tricoccous, each coccus opening with two valves. *Seed* ovate, brownish variegated with black, with a thin, brittle testa, and a sweet, nut-like, pleasant kernel.

History.—Caoutchouc is the coagulated or inspissated juice of several tropical trees, the principal ones of which are the *Ficus Elastica* and the *Hevea Guianensis*, also known by several other names. A great quantity of white, tenacious juice flows from the branches when wounded, and inspissates into an excellent Caoutchouc.—*L.* This is dried on molds of clay, and comes to us in various shapes. According to M. Weddell, Caoutchouc is obtained principally from the *Ficus Elastica* of the East Indies, also the *Urceola Elastica* of Borneo and Sumatra, and the *Siphonia Elastica*, or Syringe-Tree of the Brazils. This latter tree generally averages sixty-five or sixty-seven feet in height, with a diameter varying from thirty to forty inches, and frequently reaching forty or fifty feet before a single branch is given off. In collecting it, the natives fasten around the base of the tree, by means of clay, a small, swallow-nest-shaped, glazed dish; then, by means of a hatchet, sever the bark immediately above this, and the milky sap immediately exudes, and is collected in the dish below. Twenty trees yield, daily, about two pints, continuing this amount for some months. The most favorable period for extracting it is from April to November, during dry weather; and the trees have to be wounded afresh every day. Some allow it to coagulate in a small square box, but which requires several days with subsequent slicing and pressure, to remove air and water; and some form it into bottles, tubes, etc., by dipping a mold of clay, fastened to the end of a stick, into the fresh juice, and immediately afterward holding it in a thick smoke, produced by the combustion of oleaginous seeds, to dry. When the first layer has properly solidified, it is dipped again, and so continued until a sufficient thickness has been obtained. The smoke coagulates the milk, and exposure for some time to the sun hardens it. A small quantity of alum accelerates the coagulation of the milk, while ammonia has a contrary effect, and is useful when the milk is required to be kept some time in a liquid state. Caoutchouc is black when coagulated by smoke, but when pure it is in thin, transparent layers, of a pale-yellow color, destitute both of taste and smell; at 60° F., very elastic and adhesive, with the specific gravity, 0.9335; at 32° F., it is hard and non-elastic; at 248°, it melts, and, on cooling, remains in a semifluid, adhesive state, undergoing but very little change for years.—*T.*

It is insoluble in water, alcohol, acids, or alkalies, softens and swells up by long boiling in water, but resumes its former state on exposure to the air, and is soluble in pure ether, most fixed and volatile oils, coal naphtha, and bisulphuret of carbon. The best solvent of Caoutchouc is a mixture composed of six parts of alcohol and ninety-four of sulphuret of carbon. Its solutions in ether, oil of turpentine, and coal-tar naphtha, when dried up, leave the gum in an elastic state, and on this principle water-proof cloth is made; the same is said to be the case with its solution in the oils of lavender, sassafras and cajuput. Under exposure to heat, Caoutchouc first melts, and then distills, yielding a mixture of severalo ily liquids, all of which, as well as pure Caoutchouc itself, are carbo-hydrogens. Atmospheric air, ammonia, sulphuric and muriatic acid exert no influence upon Caoutchouc. According to Faraday, Caoutchouc consists of 87.27 parts of carbon, and 12.73 of hydrogen.—*T.*

Caoutchoucine is said to be the lightest fluid known, and yet its vapor is denser than the heaviest of the gases. It is prepared by cutting India-rubber into small pieces containing about two cubic inches each, placing them into a cast-iron still, connected with a well-cooled worm-tub, or any flat vessel with a large evaporating surface, the entire top of which can be removed for the purpose of cleaning it out. Heat is to be applied in the usual way, until the thermometer ranges at about 600° F., when as it progresses upward to this temperature, a dark-colored oil or liquid is distilled over. When the thermometer reaches 600° or thereabout, nothing is left in the still but dirt and charcoal. This oil is to be rectified, and thereby obtaining fluids varying in specific gravity, the lightest of which has not been under .670. At each rectification, the color becomes brighter and paler, until at about specific gravity .680 it is colorless and highly volatile. It must be rectified with one-third its weight of water. To enable the dirt to be removed from the bottom of the still with greater ease, throw in common solder to the depth of about half an inch; when this becomes fused the dirt is easily taken off. The disagreeable smell of this liquid may be removed by shaking it up with nitromuriatic acid, in the proportion of four fluidounces of the acid to one gallon of the liquid. Mixed with alcohol, caoutchoucine dissolves all the resins, especially copal and India-rubber, at the common temperature of the atmosphere, and it speedily evaporates, leaving them again in the solid state. It mixes with oils in all proportions. It promises to be a very valuable article for the solution of resins in the manufacture of varnishes, and for liquefying oil-paints with, instead of turpentine. Being very volatile it requires to be kept in close vessels.

When Caoutchouc is immersed in a bath of fused sulphur, heated to various temperatures, by absorbing the sulphur, it assumes a carbonized appearance, and finally acquires the consistency of horn; this is termed *Vulcanized Caoutchouc.* The same vulcanized condition can also be produced either by kneading the India-rubber with sulphur, and then exposing it to a temperature of 190°, or by dissolving the India-rubber in any known solvent, as turpentine, previously charged with sulphur. Thus treated, Caoutchouc remains elastic at all temperatures; in its ordinary state it is quite rigid at a temperature of 40°; it is not affected by any known solvents, nor by heat short of the vulcanizing point, and acquires extraordinary powers of resisting compression. A cannon ball was broken to pieces by being driven through a mass of Vulcanized Caoutchouc, which exhibited no other trace of its passage than a scarcely perceptible rent. This article may be used for various useful purposes, as springs for locks, ornaments, bottles for volatile fluids, as a covering to protect wires from corrosion, on sea or on land, life-boats, etc.

Properties and Uses.—Caoutchouc is employed for a number of purposes, as, rubbing out the writing made by lead pencils; as a cement or lute by chemists and others, being first fused; for forming tubes of various kinds for surgical and other purposes; and it also enters largely into the preparation of water-proof cloth. Indeed, its peculiar character has rendered it useful in various and numerous ways in the arts, sciences, and for domestic purposes. Softened by heat, it has been applied over small bleeding orifices to check further hemorrhage; also to arrest toothache, by placing some of it in the abnormal cavity so as to protect the dental nerve from atmospheric action. Externally it has been used as an ingredient of adhesive plasters and liniments. A grain or two has been administered in consumption, repeating it three times a day; but its results have not been such as to bring it into general use; it is seldom or never employed internally. Caoutchouc dissolved in oil of origanum or cajuput, and spread upon oil-silk or cloth, and allowed to dry, forms an excellent stimulating plaster for many local difficulties.

Marine glue or *cement* is made by digesting from two to four parts of Caoutchouc, cut into small pieces, in thirty-four parts of coal-tar naphtha, promoting solution by the application of heat, and by agitation. To the solution when formed, and which will have the consistence of thick cream, add sixty-two or sixty-four parts of powdered shell-lac, and heat the mixture over the fire, constantly stirring it, until complete fusion and combination has been effected. Pour the mixture while still hot on plates of metal, so that it may cool in thin sheets like leather. In using the cement, put some of it into an iron vessel, and heat it to about 248° F., and apply it with a brush to the surfaces to be joined.

Marine glue is much used as a cement in the preparation of cells on glass slides, etc., for microscopic purposes. An improvement upon the above formula is, to dissolve one pound of Caoutchouc in four gallons of coal-tar naphtha, and then mix one pint of the solution with two pounds of shell-lac, to which some add a drachm or two of Canada balsam. The French also prepare an *excellent cement* for those instances where water, weak spirit, creosote, or naptha, are the preservative liquids. It is made by placing some common India-rubber in an earthen pipkin over a fire, stirring the whole frequently, until it has become a liquid mass. Then throw in small quantities of powdered lime at a time, stirring the mixture well until it becomes thoroughly incorporated; continuing the addition of lime until the mass becomes very thick and tenacious. A fine rich brown color may now be given to it by the addition of a little Venetian red or vermillion. The process, being an offensive one, should be performed out of doors, and care should be taken that the mixture does not take fire, which would spoil it. All that is necessary is to roll a small piece of this out between the hands, and lay it all round the top of the jar or cell; by pressing it gently with the thumb and finger, it adheres firmly to the glass.

CAPSICUM ANNUUM.

Cayenne Pepper.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

FRUIT.

Description.—This is an annual plant, of a dark-green color, almost smooth, and growing one or two feet high. The *stems* are herbaceous, angular, furrowed, branched. The *leaves* are ovate or oblong, acuminate, entire, on long petioles, sometimes hairy on the veins underneath. The *flowers* are white, solitary, axillary, pendulous, with dark-colored oblong anthers; the *calyx* is angular, erect, persistent, with five, short acute lobes; *corolla* hypogynous, rotate, five-lobed; *corolla-tube* very short; *lobes*, spreading. *Stamens* five; *ovaries* ovate; *style* filiform; *stigma* blunt. *Fruit* of various forms, round, oblong, cordate, or horned, and either scarlet or yellow pods, smooth, shining, two-celled, containing numerous flat, dry, reniform, very acrid seeds.—*L.*

History.—There are several species of Capsicum, as the *C. Annuum*, *C. Frutescens*, *C. Baccatum*, *C. Minimum*, etc. They are natives of the East and West Indies, and of most hot climates throughout the globe. Several species are cultivated in the United States, flowering from June to September, and maturing their fruit in the latter part of autumn. They all agree in producing a shining vesicular berry of a greenish, yellowish, cherry-red, or most generally scarlet color, consisting of a thin, fleshy, inflated, bilocular, or trilocular capsule, and many small, flat, reniform seeds. The Bird Pepper, *C. Minimum*, is usually deemed the best; the *C. Annuum*, and *C. Baccatum* are the most extensively used. All the varieties of Capsicum have a faint, characteristic odor, and an extremely hot, acrimonious taste, which in some is so intense that the smallest fragment when chewed will excite a sensation of intolerable burning in the mouth. This acridity is imparted to hot water, ether, spirit, vinegar, and fixed oils. Powdered Cayenne Pepper, of good quality, is of a bright color, varying from a beautiful red to a brown or yellow, which is considerably discolored by the action of light. The color will assist much in judging the quality of the article. Its active constituent is called *Capsicin*. It is obtained by making an alcoholic extract of capsicum, and then digesting this in ether, filtering and evaporating the ethereal solution. It is a thick liquid, of a yellowish-red, or reddish-brown color, of an overpowering acrid taste, volatilizes at a moderate elevation of temperature, and disengages so acrid a vapor, that half a grain will cause every person in a large room to cough and sneeze violently. Water and vinegar slightly dissolve it, but ether, oil of turpentine, alcohol, chloroform, and the caustic alkalies readily dissolve it. With baryta it forms a solid, acrid combination. When long exposed to the air and light, it becomes hard. Chlorine whitens it.—*P.*—*T.* According to an analysis recently made by F. Victor Heydenreich, Capsicum consists of extractive with gum, a reddish-brown oil, a yellowish-brown oil or soft resin, a peculiar fatty substance, albumen, pectin, a peculiar gum, starch, coloring matter, carbonate and phosphate of potassa, chloride of potassium, sulphate and carbonate of lime, sesquioxide of iron, alum, and magnesia. He considers that the capsicin of Braconnot consists of the two oils with the fatty substance, and that the true capsicin consists of the two oils without the fatty matter.—*Am. Jour. Pharm. Vol. XXX. (3rd series), p.* 296.

Capsicum is sometimes adulterated with cantharides, pulverized woods or barks, and minium. This last may be discovered, by steeping the capsicum in nitric acid diluted with water, then adding sulphate of soda to the filtered solution, which gives a white deposit, if the metallic oxide is contained in it.

Properties and Uses.—Capsicum is a pure, energetic, permanent stimulant, producing in large doses vomiting, purging, pains in the stomach and bowels, heat and inflammation of the stomach, giddiness, a species of intoxication, and an enfeebled condition of the nervous power. The infusion is much used in colds, catarrh, hoarseness, etc. In dyspepsia, it stimulates the nerves of the stomach, promotes the secretion of the digestive juices, and assists peristaltic motion. It forms an excellent addition to quinia in intermittents, where there is a deficiency of gastric susceptibility. It has been also used in spasmodic affections, passive hemorrhages, especially uterine, and when combined with the compound powder of ipecacuanha, will, in many instances, arrest hemorrhage after parturition, promptly. It has been used successfully in Asiatic cholera. A preparation made by adding half an ounce of powdered Capsicum, and two drachms of salt, to half a pint, each, of vinegar and water, has been found an excellent anti-emetic, in all cases of vomiting or nausea. To be given in tablespoonful doses, as often as required. It has received the name of *Anti-emetic drops.* Capsicum may be used wherever a pure stimulant is indicated, in all cases of diminished vital action, and may be combined beneficially with other remedies, in order to promote their action, as emetics, cathartics, diaphoretics, tonics, etc. Dose of the powder, from one to six grains; of the tincture, from half a fluidrachm to one fluidrachm.

Externally, the infusion and tincture have been found valuable as a stimulant gargle in the ulcerated throat of scarlatina, or in chronic cynanche tonsillaris; also as a counter-irritant, as an application to indolent ulcers, and in chronic ophthalmia. It enters into various tinctures and liniments. The concentrated tincture of Capsicum has been highly recommended in the treatment of chilblains and toothache. In the former a piece of sponge or flannel must be saturated with it, and rubbed well over the seat of the chilblain, until a strong tingling and electrical feeling is produced. This application should be continued daily, until the disease is removed; relief will be experienced on the very first application, and frequently there will be a total removal of the disease after the second or third application. This, however, will depend upon the severity of the case. This medicine possesses an extraordinary power in removing congestion by its action upon the nerves and circulation; if the skin is not broken, it never causes excoriation by rubbing with it. For toothache, place a drop or two of the tincture on cotton, and apply it to the affected part; the relief will be immediate. Tinctura Capsici Concentrata, is prepared by macerating four ounces of capsicum in twelve fluidounces of rectified spirit for seven days—then filter.

The *Ethereal Oil of Capsicum*, prepared by the evaporation of a saturated ethereal tincture of the pods, is sometimes used as a rubefacient. It is of a brilliant yellowish color, with a peculiar odor and aromatic taste, and filled with crystals of *capsicin* of curious dendroid forms.

Off. Prep.—Emplastrum Calefaciens; Linimentum Olei Compositum; Linimentum Camphori Compositum; Linimentum Capsici Compositum; Pulvis Lobeliæ Compositus; Pilulæ Camphoræ Compositæ; Pilulæ Valerianæ Compositæ; Tinctura Capsici; Tinctura Lobeliæ et Capsici; Tinctura Myrrhæ Composita; Tinctura Camphoræ Composita; Tinctura Viburni Composita; Vinum Hydrastis Compositum.

CARBO ANIMALIS.

Animal Charcoal.

CHARCOAL OBTAINED FROM BONES—BONE-BLACK, IVORY-BLACK.

Preparation.—When bones, or indeed any animal substances, are exposed to a red heat in covered iron vessels, or retorts, until they cease to emit any vapor, the result is animal charcoal. *Bone Spirit*, an ammoniacal fluid, is also obtained by this process of destructive distillation, from the vapor which passes over. The Animal Charcoal or bone-black thus obtained is impure, and although serviceable for many purposes in pharmacy and the arts, yet it will be found unfit for others unless purified. The impurities it contains are phosphate and carbonate of lime, carburet, and siliciuret of iron, and sulphurets of iron and calcium. To purify it, the bone-black in fine powder is digested in diluted muriatic acid, which dissolves or decomposes all the calcareous compounds as well as sulphuret of iron, with the disengagement of much carbonic acid and some sulphureted hydrogen. The residuum is then thoroughly washed with boiling water, and contains only charcoal with a small proportion of carburet and silica. The charcoal is now thoroughly dried, at first by a moderate heat, and then at a low red heat; because its decolorizing power which was destroyed in the previous steps of its purification, is only restored after the action of a pretty strong heat.—*C.*

History.—Animal Charcoal is a tasteless, insoluble, rather coarse powder, of a dark brownish-black color. It somewhat resembles vegetable charcoal, but is more dense, and less combustible. Upon long exposure to the atmosphere it absorbs moisture, and loses its decolorizing properties, for which it is chiefly employed. The nature of its decolorizing action is not well understood, though supposed to be owing to its peculiar porous texture. It not only removes the coloring principle of vegetable infusions and tinctures, but is likewise capable of taking up their bitter principles, and when purified, takes iodine from solutions containing it, takes numerous salts from their watery solutions, and changes chromate of potassa into the carbonate.

Properties and Uses.—Its principal uses are, to decolorize various organic matters, as strychnia, cinchonia, etc., to purify syrups, and to remove from spirit prepared from grain, its grain or fusel oil. It has likewise been highly extolled as an internal remedy, in doses of half a grain to three grains, twice a day, in scrofulous and cancerous affections, gôitre, obstinate chronic glandular indurations, etc. Not used in this country medicinally. Like vegetable charcoal, it destroys the odor of putrid animal matter. Dr. A. B. Garrod, in a paper read before the Medical Society of London, Nov. 17th, 1846, recommends purified Animal Charcoal in cases of poisoning by opium, strychnia, aconite, belladonna, stramonium, tobacco, hemlock, arsenic, etc. First remove as much of the poison as possible by means of the stomach-pump, or emetics combined with the antidote, and then give a large quantity of the Animal Charcoal diffused in warm water; a vegetable emetic must not be used as the charcoal would destroy its emetic property. He considers this agent equal, if not superior to the hydrated sesquioxide of iron, as an antidote to arsenious acid.

CARBO LIGNI.

Charcoal.

Preparation.—Wood or vegetable Charcoal for pharmaceutical or other purposes, is made by forming a conical-shaped pile of logs of wood not more than six feet long, and six inches thick, covering it with a compact earthy layer in such a way as to exclude the approach of atmospheric air, and leaving several orifices below, and one above. It is then fired from below, and when combustion has taken place and the whole pile ignited, the various orifices are closed so as to limit the draught as much as possible without extinguishing the flame. By this process the hydrogen and oxygen of the wood are dispersed, while its carbon is left, being a charred wood, or Charcoal. From 16 to 19 per cent. of Charcoal is obtained by this process; but if the wood be charred in iron vessels, or retorts, from 20 to 24 per cent. of Charcoal is obtained.—*P.*—*C.*—*T.*—*Ed.*

For medical purposes, Charcoal thus prepared is not pure enough for internal use, as all the woody evaporable matters are not entirely dissipated. It may be purified according to Lowitz, by placing fine common Charcoal in a crucible, and when filled, cementing on a cover containing several orifices. This is to be exposed to a red heat, which must be continued as long as flame of a blue color emerges from the orifices of the cover, and when this has stopped, remove from the fire, and when cold place the Charcoal as soon as possible in glass vessels, which must be kept well closed.

History.—Wood Charcoal forms a dark brownish-black powder, composed of shining particles, insipid, odorless, not soluble in water, easily inflammable, much more so than animal charcoal, and is an excellent conductor of electricity, but not of caloric. It corrects the fetor from putrid animal matters, and decolorizes vegetable infusions, but not so promptly as the animal charcoal. It decomposes metallic compounds when heated with them by depriving them of their oxygen. If kept in the air, its weight is speedily augmented in consequence of its affinity for moisture, which takes place to the amount of from ten to fifteen per cent. Combustion disengages its carbonic acid, leaving behind an ash composed of earthy matters and carbonate of potassa.

Properties and Uses.—As a medicine, Charcoal should always be purified. "Charcoal is generally described as possessing antiseptic properties, while the very reverse is the fact. Common salt, corrosive sublimate, arsenious acid, alcohol, camphor, creosote, and most essential oils, are certainly antiseptic substances, and therefore retard the decay of animal and vegetable matters. Charcoal, on the contrary, greatly facilitates the oxidation, and, consequently, the decomposition of any organic substances with which it is in contact; it is, therefore, the very opposite of an antiseptic."—*Dr. Stenhouse.* Its internal employment will be found useful in those digestive derangements which are associated with an offensive breath and disagreeable belchings; also to correct the fetid condition of the stools in dysentery. It is also useful in acidity of stomach, flatulency, and in the nausea and constipation attending pregnancy. It is also very useful for internal heat and irritation of the stomach, with acidity; sick headache; diarrhea; cholera-infantum, etc. In some cases it may be advantageously combined with the trisnitrate of bismuth as a sedative; and where a laxative action is required, rhubarb may be beneficially added to it. Bilious colic is said to have been cured by it, in doses of a drachm to two fluidounces of burnt brandy, repeated as required. The ordinary dose is from twenty grains to two drachms, two or three times a day, in water, milk, or burnt brandy, repeating it according to indications. Externally, used in poultices to correct fetor of ulcers, arrest gangrene, etc., and is efficient in many cutaneous diseases. It occasionally enters into tooth-powders, and may be used with advantage to correct the fetor of the mouth, and cleanse the teeth. In such cases the Charcoal prepared from bread is the best, as it contains no gritty particles.

Off. Prep.—Cataplasma Carbonis.

CARTHAMUS TINCTORIUS.

Dyer's Saffron.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

FLOWERS.

Description.—Carthamus Tinctorius, sometimes known as *Safflower*, *Bastard Saffron*, etc., is an annual plant, with a smooth *stem* growing from one to two feet high, striate, and branching at top. The *leaves* are alternate, ovate-lanceolate, sessile, spinose-denticulate, subamplexicaul, smooth and shining. The *flowers* are numerous, long, slender, orange-colored, in large, terminal, discoid heads; the *florets* tubular; *corolla* infundibuliform, five-cleft.—*W.*

History.—This plant is cultivated in this country and Europe, though inhabiting Egypt, and the countries surrounding the Mediterranean. The orange-red florets are the officinal parts, and are generally met with in the shops in laminated masses, with the yellow filaments accompanying; their odor is peculiar and aromatic, and the taste slightly bitter. The cultivated Safflower in this country is usually sold unpressed, as American Saffron. It contains two coloring matters: the first, which is soluble in water, is yellow; the other has a beautiful red color, is insoluble in water, fixed and volatile oils, and in dilute acids, slightly soluble in alcohol, but readily soluble in alkaline solutions, and is termed *Carthamine* or *Carthamic Acid*, $C_{14} H_8 O_7$. Dried and mixed with French chalk, it constitutes rouge, which is used as a cosmetic.—*T.*—*P.* Dyer's Saffron is sometimes used to adulterate genuine Saffron, but may be detected by the cannular form of the flowers, the reddish-yellow color of their stamens and pistils, and the absence of the white ends belonging to the true Saffron.

Properties and Uses.—Dyer's Saffron is said to restore the menstrual discharge which has been recently suppressed by cold, when the warm infusion is used; also to produce an action on the bowels when taken largely. The warm infusion is often employed in domestic practice as a diaphoretic among children and infants, in measles, scarlet-fever, and other eruptive maladies. It may be given tolerably freely. The infusion may be made by infusing a drachm or two of the flowers, in half a pint of boiling water. The seeds are white and angular, and have been much used as purgative and emmenagogue. They yield an oil by expression, which has been used as a local application in rheumatic and paralytic affections, also for bad ulcers.

CARUM CARUI.

Caraway.

Nat. Ord.—Apiaceæ or Umbelliferæ. *Sex. Syst.*—Pentandria Digynia.

SEEDS (HALF FRUITS).

Description.—Carum Carui is a biennial plant, with a fusiform, fleshy *root*, and a *stem* about two feet high, erect, branched, leafy, angular and furrowed. The *lower leaves* are nearly a span long, bright green, petioled, doubly pinnate, with numerous opposite, finely cut leaflets, of which the pairs next the midrib cross each other; those on the stem much smaller, opposite, very unequal. *Umbels* numerous, erect. *General bracts*, if present, capillary, connected when more than one by a membranous base. *Flowers* numerous, white or pale flesh-colored; the marginal ones only perfect and prolific. *Peduncles* very small, convex. *Calyx* extremely minute; *petals* five, obovate, inflexed. *Stamens* as long as the petals; *anthers* small, bilobed, *ovary* ovate. *Fruit* or *mericarps*, narrow, bright-brown, elliptic-ovate, about two lines long, with pale, elevated, filiform ridges, and shining convex channels.—*L.*

History.—Caraway is indigenous to Europe, growing in the meadows and on the mountains of the South of France, and flowering from April to July. It is also cultivated in the United States. Its seeds are completed in the second year of its growth, when they mature in the latter part of summer. They are procured by beating the plant after it has been removed from its place of growth. They are termed mericarps, are ovate, elongated, recurved, of a green-brown color, with five lighter colored primary ridges, and a vitta in each interval, and about one and a half to two lines in length; their odor is aromatic and peculiar, and their taste spicy and heating, which virtues are due to a volatile oil, and are readily yielded to alcohol or ether. The oil is at first pale, becomes darker by age, and has the peculiar fragrance and taste of the seed.

Properties and Uses.—Caraway is an aromatic carminative, used in flatulent colic, especially of children, and to improve the flavor of several officinal compounds. Dose of the seeds from ten to sixty grains. The oil (*oleum carui*) is more generally used. The seeds are frequently added to cakes and confectionaries to render them more agreeable, while, at the same time, they gently excite the digestive powers.

Off. Prep.—Oleum Carui; Tinct. Cardamomi Comp.

CARYOPHYLLUS AROMATICUS.

Cloves.

Nat. Ord.—Myrtaceæ. *Sex. Syst.*—Icosandria Monogynia.

UNDEVELOPED FLOWERS.

Description.—Caryophyllus Aromaticus is a beautiful tree, rising to the height of fifteen or twenty feet; it is of a conical or pyramidal form, evergreen, and the whole plant is glabrous. The *branches* are numerous, slender, opposite, and more or less virgate. The wood of the *stem* is hard; its *bark* grayish and smooth. The *leaves* are opposite and decussate, persistent, somewhat coriaceous and shining, minutely punctated, about four inches long and half as broad, ovate-lanceolate, more or less acute, quite entire, pale beneath, tapering gradually at the base into a slender footstalk, which is nearly two inches long. The *flowers* are very odoriferous, and are in short, terminal, many-flowered panicles, trichotomously divided, and jointed at every division. *Peduncles* terete, green. *Calyx* of four, ovate, concave segments, erecto-patent, placed upon the top of the ovary, and together with it, is first green, and then red, coriaceous. *Petals* four, larger than the calyx, imbricated into a globe in bud, at length spreading, roundish, concave, yellowish-red, very soon caducous. In the center of the calyx and occupying the top of the ovary, is a quadrangular, elevated line or gland, surrounding, but not embracing the base of the shortish, obtusely-subulate *style;* around this gland, immediately within the petals, the *stamens* are inserted,—these are longer than the petals, yellow, with small, yellow, ovate-cordate, two-celled *anthers.* The *ovary* is oblong, almost cylindrical, two-celled, with many small ovules in each cell. The *berry* is purplish, elliptical, two-seeded. *Seed* covered with a thin integument, of soft texture.—*L.*

History.—A tall and beautiful tree, growing in tropical climates. The flowers are collected in October and November, before they are fully developed, and consist of a tubular calyx, bearing a roundish bud of unexpanded petals; they are quickly dried in the shade to prevent the escape of volatile oil. The finest kinds are plump, heavy, and dark, and give out oil when squeezed with the nail. They are from half an inch to nearly an inch long, and a line or two in diameter, of a dark-brown color, with a yellowish-red tint, a pleasant, peculiar, penetrating odor, and a burning, aromatic, slightly astringent taste. Cloves contain volatile oil, fixed oil, a peculiar tannin, gum, resin, fiber, water, and two crystalline principles called *Caryophyllin* and *Eugenin.*—*P.*

They yield their virtues to alcohol, spirit, and ether; water merely acquires their aroma. The active properties reside in the volatile oil which is of a pale reddish-brown color, darkens by age, and is heavier than water; it is extremely pungent and acrid.

Properties and Uses.—Aromatic, stimulant, and irritant. Used to allay vomiting and sickness at stomach, to stimulate the digestive functions, and to improve the flavor or operation of other remedies, and prevent a tendency to their producing sickness or griping. Dose, from five to ten grains.

Off. Prep.—Linimentum Olei; Mistura Cajuputi Composita; Oleum Caryophylli; Pilulæ Aloes Compositæ; Tinctura Quiniæ Composita; Tinctura Guaiaci Aromatica; Vinum Cinchonæ Compositum.

CASSIA FISTULA.

Purging Cassia.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Decandria Monogynia.

PULP OF THE PODS.

Description.—Cassia Fistula is a tree growing from twenty to forty feet high, with many spreading branches toward the summit; the wood is hard and heavy; the *leaves* are pinnate, alternate, from twelve to eighteen inches long, deciduous. The *leaflets* are opposite or nearly so, from four to eight pairs, the lower broad ovate, smooth, obtuse or emarginate, polished on both sides, on short, round petioles, from two to six inches long, and from one and a half to three broad. The *flowers* are large, fragrant, bright-yellow, on long, slender, smooth pedicels. *Racemes* axillary, pendulous, simple, one or two feet long. The *calyx* has five nearly equal, oblong, obtuse, smooth sepals. The *corolla* consists of five *petals*, which are oval, unequal, concave, spreading, and waved. The three lower *filaments* much longer than the others, and having a double curve, but no swelling. *Anthers* on the three long filaments oblong, opening by two lines on the face, the other seven clavate, with pores at the small end. *Ovary* filiform, smooth, cylindrical, curved, one-celled, containing numerous seeds. The *fruit* is a woody, dark-blackish-brown, cylindrical pod or legume, a foot or more in length, and about an inch in diameter, terete, smooth, blunt, indehiscent, filled with a viscid, reddish-black, sweetish pulp, divided into many cells by hard transverse phragmata; *cells* one-seeded; *seed* oval, glossy, somewhat flattened.—*L.*

History.—Purging Cassia inhabits Egypt, and the Indies, and has become extensively diffused in various tropical countries, as China, Hindostan, West Indies, etc. The part used in medicine is the fruit or pods, and those are to be preferred which are heavy and new, and do not, when shaken, make a rattling noise from the seeds being loose within them. The pulp should be of a bright, shining, black color, and have a sweet taste, neither harsh, from the fruit being collected before it be fully ripe, nor at all sourish, which it is apt to become upon keeping, nor at all moldy, which is frequently the case when kept in damp cellars, or moistened to increase its weight.—*Ed.* To obtain the pulp, the pods are pounded so as to break their outer coat, and then they are infused in boiling water, which dissolves the pulp; the infusion is then strained, and evaporated to the proper consistence. The pulp has a feeble nauseous odor, a mucilagino-saccharine taste, and contains, according to Henry, sugar, gum, impure tannic acid, coloring matter, a gluten-like matter, and moisture. It keeps longest when preserved in the pod. It is nearly soluble in water, and its active parts are taken up by alcohol.

Properties and Uses.—One or two drachms, acts as a mild and effectual laxative; an ounce or two is cathartic, but excites nausea, flatulence, gripings, etc.—*Ed.* It is generally employed only in the electuary of senna.

CASSIA MARILANDICA.

American Senna.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

LEAVES.

Description.—Cassia Marilandica is an American, perennial herb, growing from four to six feet high, with round, striated, smooth, or slightly hairy *stems.* The *leaves* are alternate, on long petioles, at the base of which is a large ovate, shining green gland, terminating in a dark point at top, which is sometimes double; each petiole contains from eight to ten pairs of *leaflets*, which are oblong, smooth, entire, mucronate, somewhat hairy at the edges, an inch or two long, and from five to ten lines broad. The *flowers* are bright yellow, in axillary racemes, extending quite to the top of the stem; *peduncles* slightly furrowed, and marked with minute, blackish, glandular hairs; *sepals* five, oval, obtuse, the lateral ones longest. *Petals* five, concave, very obtuse. *Stamens* ten, the three upper have short abortive anthers; to these succeed two pairs of deflexed, linear, brown anthers; the remaining lowermost three taper into a sort of beak, the middle one being shortest. *Legumes* from two to four inches long, pendulous, linear, curved, swelling at the seeds, and furnished with slight hairs; *seeds* many.—*L.*

History.—This plant is frequently met with in alluvial soils, from New England to Carolina, flowering from June to September, about which time the medicinal parts of the plant should be gathered. The leaves yield their properties to alcohol or water; they are nearly odorless, have a Senna-like, mawkish taste, and in medicinal power are equal to foreign Senna. The Shakers cultivate the plant, and dispose of it in firmly pressed packages. Mr. Martin, of Philadelphia, found the leaves to contain albumen, mucilage, starch, chlorophylle, yellow coloring matter, volatile oil, fatty matter, resin, lignin, salts of potassa and lime, and a principle resembling *cathartin.*—*Am. Jour. Pharm., Vol. I., p.* 22.

The *Cassia Chamæcrista*, Prairie Senna or Partridge Pea, growing on the Western prairies, is an excellent substitute for the above; it is likewise known as *Dwarf Cassia* and *Sensitive Pea.*

Properties and Uses.—An excellent cathartic, equal to the imported article, for which it may be substituted. But owing to the presence of argel leaves, the foreign Senna has its activity increased; hence, in giving the American article, its dose must be somewhat increased. It may be given in powder or infusion, and should be combined with aromatics to prevent any proneness to griping. The dose in powder is from half a drachm to two and a half drachms. The infusion may be made by adding one ounce of the leaves, with a drachm of coriander seeds, to a pint of boiling water. Macerate for an hour in a covered vessel, and strain; dose, four or five fluidounces.

CASSIA ACUTIFOLIA.

Senna.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—There are several species of Cassia plant, which are supposed to furnish the *Senna*, as the *C. Acutifolia*, *C. Obovata*, *C. Elongata*, *C. Lanceolata*, etc. *Cassia Acutifolia* is a perennial shrub, growing from two to ten feet high; the *stem* is erect, smooth. The *leaves* are alternate, narrow, equally pinnated; the *leaflets* are in pairs, from four to eight on each leaf, ovate, nearly sessile, smooth above, rather downy beneath, with the veins turning inward, and forming a flexuose intramarginal line; *petioles* without glands; *stipules* softly spinescent, semihastate, spreading, minute. The *flowers* are bright yellow, in erect, stalked, axillary and terminal racemes, rather longer than the leaves; *pedicels* without bracts. *Sepals* linear, obtuse. *Stamens* ten, the five lowest small and sterile, the next two large, curved, and perfect, the three uppermost minute and gland-like. *Ovaries* linear, downy, falcate, with a smooth recurved style. *Legumes* or *pods*, pendulous, oblong, flat, membranous, about an inch long and half an inch broad, quite straight, tapering abruptly to the base, and rounded at the apex; *seeds* many, ash-colored, cordate.—*L.* It grows in Nubia and Upper Egypt, and yields most of the commercial Alexandria Senna consumed in this country.

Cassia Obovata is a perennial herbaceous plant, smaller than the preceding, being about eighteen inches high, with an erect or procumbent, smooth *stem*, downy at the base. The *leaves* are alternate, equally pinnate, smooth, with no gland upon the petiole; the *leaflets* are in four to six pairs, opposite, obovate, rounded, mucronate at the apex, unequal at the base, the uppermost gradually the largest; *stipules* narrowly triangular, rigid, acute, spreading, persistent. *Flowers* pale yellow, on erect, rather lax, axillary, stalked racemes. *Legumes* oblong, falcate, membranous, smooth, rounded at each end, with an elevated ridge upon the valves over each side, so as to have an equally interrupted ridge along the middle, and toward which the veins of each suture are directed nearly at right angles; *seeds* six to eight, cordate.—*L.* This species grows in the high, dry, uncultivated lands of Mysore, Egypt, Nubia, desert of Suez, Central Africa, etc., and is cultivated in many parts of southern Europe. It is very nearly identical with the *C. obtusata* of Hayne. It furnishes an inferior Senna, known as the Italian or Aleppo.

Cassia Elongata, although an annual, may with attention be kept alive beyond the year, and made to assume a suffruticose character. It differs from C. Acutifolia in having its leaflets lanceolate instead of ovate, and the legumes longer and not so round; seeds deep-brown. It grows in central India, and has been introduced in Tinivelly.

Cassia Lanceolata resembles the above, having, however, never more than four or five pairs of *leaflets*, oblong, and either acute or obtuse, not at all ovate or lanceolate, and perfectly free from downiness even when young; the *petioles* have constantly a small, round, brown gland a little above the base. The *pods* are erect, oblong, tapering to the base, obtuse, turgid, mucronate, rather falcate, especially when young, at which time they are sparingly covered with coarse, scattered hairs. It grows in Arabia, and was considered by Forskhal as the true Mecca Senna.—*L.*

History.—These are supposed to be the principle species which yield the Senna, though much uncertainty exists with regard to them, arising from the want of genuine specimens, the difficulty attending the investigation of the plants in their native soil, the ignorance of the influences which a change of locality may exert upon them, and whether any specific characters are to be based upon the appearance of the petiole-glands. Although this confusion exists in the botanical history of Senna, yet in commerce but three varieties of the drug are found, or which are ever imported into this country; these are, the *Alexandrian* or *Egyptian*, which is the finest and most valuable article, the *Indian*, and the *Tripoli Senna.*

ALEXANDRIA SENNA is collected from Sennaar, Nubia, and Upper Egypt, and made up at Boulak, not far from Cairo, under the superintendence of the Egyptian government, from which place it is forwarded to Alexandria, for the European markets. It consists of the leaflets of *C. Acutifolia*, *C. Obovata*, pods, broken leafstalks, flowers, etc., likewise the leaves of *Cynanchum Oleæfolium*, or *Solenostemma argel.* The leaves are gathered by cutting the branches in autumn, commencing in September, and are exposed to the sun and atmosphere until they are quite dry, when the branches are removed by threshing, the leaves placed in sacks, and sent to Boulak, at which place their adulteration with other leaves is said to take place.

As received in this country, Alexandria Senna is generally in bales and barrels, and is considered the finest and most valuable variety; the best and most esteemed is that which contains the least quantity of cynanchum leaves, Senna leafstalks and pods, where the entire-lanceolate leaves are numerous, and where the odor and taste is strong and pure. It has a peculiar but not disagreeable odor, with an unpleasant, nauseous, mucilaginous, and sweetish taste, with hardly any perceptible bitterness, unless it be adulterated with the leaves of the *Argel* or *Cynanchum oleæfolium* which impart bitterness to the powder or infusion, and which is the most important impurity to remove. They may be recognized by having no visible lateral nerves on their under-surface; by being longer, thicker and firmer than Senna leaves; by the greater regularity of their base, being of a lighter color, of a bitter taste, and often spotted with a yellow, bitter, gummy-resinous incrustation.

TRIPOLI SENNA somewhat resembles the Alexandrian, but is considered much inferior to it; the leaves are more fragmentary, and the leafstalks more numerous. It seems to embrace one of the acute-leaved species with a small quantity of *C. Obovata*, and very seldom contains any adulteration with the argel leaves. There is much uncertainty as to the place from which it is derived.

INDIA or MOCHA SENNA is of three kinds, the Bombay, the Madras, and the Tinnivelly, of which the first is usually imported from Bombay, though it comes in the first instance from Mocha and other ports of the Red Sea; the second and third from Madras; of these, the Tinnivelly is esteemed the best. India Senna consists mainly of large, thin, unbroken, acute, yellowish-green leaves, rarely adulterated, and is as good as the Alexandrian. There are other varieties, but they seldom reach this market.

Good Senna may be known by the bright, fresh, yellowish-green color of the leaves, with a faint and peculiar odor somewhat similar to green tea, and a nauseous, mucilaginous, sweetish, and slightly bitter taste; and the fewer the stalks, seed-pods, broken leaves, and dirt, the better is the Senna. Its active principles are taken up by cold or warm water, alcohol and proof-spirits; boiling destroys its virtues unless it be in vacuo, or in a covered vessel. Various analyses have been made of Senna, but there are none on which we can satisfactorily rely. M. M. Lassaigne and Feneulle found it to contain a peculiar bitter principle called Cathartin, chlorophylle, fixed oil, a small quantity of volatile oil, albumen, yellow coloring matter, mucilage, malate and tartrate of lime, and acetate of potassa, and some mineral salts. The cathartin is a yellowish-red, uncrystallizable substance, of a peculiar odor, and a bitter, nauseous taste, very soluble in water and alcohol, but insoluble in ether. It is considered to be the purgative principle of the drug, yet this is not universally admitted, as several experimenters deny that it possesses any purgative power whatever. The infusion or decoction of Senna is *incompatible* with strong acids, alkaline carbonates, lime-water, tartar emetic, acetate of lead and tannin, or astringent plants containing tannin. The tartarized antimony and acetate of lead do not precipitate the cathartin.

Properties and Uses.—Senna is a certain, manageable, and convenient cathartic, very useful in all forms of febrile disease, and other diseases where a severe impression on the bowels is not desired. Its influence is chiefly exerted on the small intestines, augmenting their mucous secretions, exciting increased peristaltic motion, and producing loose brown evacuations. It does not act as a sedative, as is the case with some cathartics, nor as a refrigerant; but has a slight stimulating influence, insufficient, however, to contra-indicate its use in cases of general excitement, or reaction. Beside the nauseating taste of Senna, it is apt to cause sickness at stomach, and very few persons can use it alone, without experiencing more or less griping pains. The addition of cloves, ginger, cinnamon, or other aromatics, are excellent correctives of these unpleasant effects. A teaspoonful of cream of tartar to a teacupful of the decoction or infusion of Senna, is a mild and pleasant cathartic, particularly suited for females where it may be required soon after delivery. The addition of neutral laxative salts is another mode, adopted by a certain class of practitioners, of preventing the tormina, and at the same time of increasing the activity of the infusion of Senna, as phosphate of soda, Epsom, or Rochelle salts; these are, however, rarely used by Eclectics. Saccharine and aromatic substances are also sometimes combined for this purpose, as sugar, manna, aromatic seeds, electuary of Senna, etc. The purgative effect of Senna is much increased by the addition of the pure bitters; the decoction of guaiacum is said to answer a similar purpose. Senna is contra-indicated in an inflammatory condition of the alimentary canal, hemorrhoids, prolapsus ani, etc. The dose in powder is from thirty to fifty grains; in tincture, from half a fluidounce to two fluidounces; electuary, two drachms; and of the infusion, which is the most usual mode of administration, from two to four fluidounces.

A preparation termed *Cassine*, said to be the active principle of the Alexandria Senna, is advertised as a preparation of an Eastern manufacturing establishment. It is stated to be a whitish-brown powder, of a slightly bitter taste, a Senna-like odor, soluble in water and insoluble in alcohol. I have not seen it, nor have I been able to obtain its mode of preparation.

Off. Prep.—Enema Sennæ Composita; Extractum Rhei et Sennæ Fluidum; Extractum Spigeliæ et Sennæ Fluidum; Extractum Sennæ et Jalapæ Fluidum; Infusum Sennæ; Pulvis Jalapæ Compositus; Tinctura Sennæ Composita.

CASTOREUM.

Castor.

History.—This drug is a peculiar solidified secretion procured from peculiar follicles, two in number, connected with the external genital organs of the *Castor Fiber*, or Beaver. These follicles are filled with a thick fluid secretion, which slowly concretes when they are removed from the animal. Most of the Castor of the present day is derived from the beaver of North America. It has much the appearance of a pair of dried testicles united by their spermatic chords, dark liver-brown and wrinkled externally, paler liver-brown internally, resinous in fracture, when perfectly dried of a strong, peculiar heavy odor, and of an aromatic, bitter, offensive taste. Rectified spirit is its best solvent; though ether extracts a good part of its virtues.

The Russian Castor, from the Russian dominions, is seldom seen in this country; it may be distinguished from the American by being more fully developed, weightier, and less cohesive, by its more powerful odor and taste, and by effervescing with hydrochloric acid. The American Castor gives a white precipitate with aqua ammonia, the Russian, an orange-yellow. Castor, when of good quality, has a strong, heavy, characteristic odor, and a bitter, aromatic, offensive taste. It is composed of numerous salts, mucus, a volatile oil, a resinous substance, a horny matter, osmazome, and a peculiar, crystalline, non-saponifiable principle called *castorin.* Castor becomes deteriorated by time, and this is hastened by an augmented temperature of the atmosphere; a damp atmosphere occasions its ready spoliation. When kept in a cool situation, in well-closed vessels, its virtues will continue uninjured for some years. A tasteless and inodorous article is inert. A spurious Castor is sometimes met with, which is composed of several drugs combined, intermixed with dried lamina of mucous tissue, odorized by a small portion of good Castor, and then placed within a goat's scrotum. The deficiency of the little follicles which hold a fatty substance, the faint smell, and the feeble Castor taste, and the want of other determinate characters, will at once expose the imposture. Wöhler has detected salicin and carbolic acid in Castor; and Pereira has found the hydruret of salicyle in *aqua castorei* prepared from American Castor.—*P.* —*Ed.*

Properties and Uses.—Moderately stimulant, antispasmodic, and emmenagogue. Used in hysteria, amenorrhea, epilepsy, and many irregular nervous affections. Dose of the drug, from ten to twenty grains; of the tincture, from half a fluidrachm to two fluidrachms.

Off. Prep.—Tinctura Castorei; Tinctura Castorei Ammoniata.

CAULOPHYLLUM THALICTROIDES. (*Leontice Thalictroides.*)

Blue Cohosh.

Nat. Ord.—Berberidaceæ. *Sex. Syst.*—Hexandria Monogynia.

ROOT.

Description.—This plant, likewise known as *Squaw-root*, *Pappoose-root*, is a smooth, glaucous plant, purple when young, with a high, round *stem*, from one to three feet in height, simple from knotted and matted rootstocks, and dividing above into two parts, one of which is a triternate leafstalk, the other bears a biternate leaf and a racemose panicle of small, yellowish-green flowers. The *leaves* are biternate and triternate; *petiole* trifid, and supporting nine leaflets. *Leaflets* oval, petiolate, unequally lobed, the terminal one equally three-lobed, paler beneath, and from two to three inches long. The *flowers* appear in May and June. *Panicle* small, shorter than the leaves. *Pericarp* thin, caducous, dark-blue, resembling berries on thick stipes. *Seeds* one or two, erect, globose, about the size of a large pea.—*W.*—*G.*

History.—A handsome perennial plant, growing all over the United States, in low, moist, rich grounds, near running streams, in swamps, and on islands that have been overflowed with water. The seeds ripen in the month of August, and, when roasted and boiled in water, form a decoction strongly resembling coffee. The berries are dry and rather mawkish. The officinal part is the root, which is sweetish, somewhat pungent, and aromatic, and affords a yellow infusion or tincture. No chemical analysis of the root has been made, though it affords a resinous principle, to which I have given the name of *caulophyllin.*

Properties and Uses.—This is a favorite agent of American physicians, which is becoming generally appreciated. It is principally used as an emmenagogue, parturient, and antispasmodic; but it likewise possesses diuretic, diaphoretic, and anthelmintic properties. It has been successfully employed in rheumatism, dropsy, colic, cramps, hiccough, epilepsy, hysteria, uterine inflammation, etc. It is a valuable agent in all chronic uterine diseases, appearing to exert an especial influence upon the uterus, and has been found serviceable in uterine leucorrhea, amenorrhea, dysmenorrhea, etc. When used in decoction, for several weeks previous to the parturient period, it is said to facilitate that process, acting as a preparatory parturient, and it is sometimes combined with the *Mitchella Repens* and *Eupatoria Aromatica*, for this purpose. Combined with equal parts of powdered Hydrastis Can., made into an infusion, and sweetened with honey, it forms an elegant and effectual wash for aphthous sore-mouth and throat. In decoction, Blue Cohosh is preferable to ergot for expediting delivery, in all those cases where the delay is owing to debility, or want of uterine nervous energy, or is the result of fatigue. The decoction or infusion may be made by adding an ounce of the root to a pint of boiling water, and boiling or macerating for a short time; the dose of either is from two to four fluidounces, three or four times daily. The tincture should be made by adding three ounces of the finely powdered root to a pint of alcohol, and allow it to macerate for fourteen days; then filter. The dose is from half a fluidrachm to two fluidrachms.

Off. Prep.—Caulophyllin; Extractum Caulophylli Hydro-alcoholicum; Tinctura Caulophylli Composita.

CAULOPHYLLIN.

THE ACTIVE PRINCIPLE OF THE ROOT OF CAULOPHYLLUM THALICTROIDES.

Preparation.—Caulophyllin is the name I have given to the active principle of the root of Caulophyllum Thalictroides. It is an American remedy, not used by all classes of practitioners, and was first manufactured by W. S. Merrell, of Cincinnati. He prepares it by precipitation from the saturated tincture, similar to the preparation of cimicifugin, using, however, as small a quantity of water as possible to prevent waste, as the precipitate is soluble in water.

Chemical Properties.—Caulophyllin thus prepared is a resinous substance of a light-brown color, with a peculiar, not unpleasant odor, somewhat similar to podophyllin, and leptandrin, and a slightly bitter taste, with some degree of pungency. Its chemical reactions have not been thoroughly investigated; it appears, however, to be a neutral substance, like salicin, exhibiting neither acid nor alkaline principles. It is insoluble in ether. In water it is partially soluble, in alcohol more so; the addition of aqua ammonia renders it completely soluble in either menstruum, and the solution becomes of a dark-reddish wine color. Its aqueous solution is also rendered perfect by the addition of liquor potassa, nitric or muriatic acids. Acetic acid does not solve it.

The following is the process pursued for obtaining Caulophyllin by Dr. F. D. Hill; this gentleman has no desire to foist upon the profession any remedies the process for obtaining which is secret, and whenever I have called upon him for information concerning his mode of manufacturing the concentrated remedies, he has never hesitated to promptly and cheerfully give it. Exhaust the root of caulophyllum, and obtain a thick fluid-extract, in the same manner as recommended for obtaining Caulophyllin; that is, by making an alcoholic tincture, then percolating and distilling. The product thus obtained is added to twice its volume of a saturated aqueous solution of alum, and placed aside to rest for three or four days; then place it on a filter-cloth, and allow the water to filter through; wash the product two or three times with fresh water, and let the residuum dry in the open air. When dry it readily forms a powder of a light-grayish color.

The N. Y. Journal of Organic and Medical Chemistry, vol. I, p. 12, states that Caulophyllin may be obtained by treating the root of Caulophyllum with distilled water, and obtaining an aqueous solution by percolation. This solution is to be decolorized by animal charcoal, then evaporated in *vacuo*, and precipitated with an infusion of nut-galls, or, what is still better, 96 per cent. alcohol. A white precipitate is obtained, which can be dried on filter-cloth, and powdered. The properties of the Caulophyllin thus obtained are similar to those detailed above, being soluble in water, partly so in alcohol, and possessing similar therapeutic influences; yet it is there termed an alkaloid. It is to be regretted that in our eagerness to discover concentrated medicinal principles and their therapeutic advantages, but little attention has been bestowed upon their chemical relations, or the many gross impositions which have been practiced in this department of pharmacy by unprincipled individuals.

Properties and Uses.—Caulophyllin appears to exert a direct influence upon the uterus, acting as an alterative, uterine tonic, and parturient, according to the periods in which it is employed. In the more common unhealthy conditions of this organ and its appendages, known as amenorrhea, dysmenorrhea, passive menorrhagia, leucorrhea, congested cervix, etc., it is equal to if not surpassing the cimicifugin. A combination of equal parts of Caulophyllin, cimicifugin, and carbonate of ammonia, will be found especially valuable, not only in the above-named affections, but likewise in epilepsy, hysteria, rheumatism and dropsy, in which diseases it has been recommended as an antispasmodic. It may also be advantageously combined with aletrin, asclepidin, senecin, etc., in many forms of disease of the female generative organs. It has been spoken of as a parturient, but we have no knowledge of its influence as such—though we are aware that the root from which it is prepared does exert a parturient effect; which property, if retained by the Caulophyllin will no doubt render it valuable to the accoucheur. Added to podophyllin, or other active purgatives, it prevents tormina, and is, probably, the best agent that can be employed for this purpose.

Dr. T. J. Kindleberger of Springfield, O., writes that he has used it with much advantage in after-pains, in menstrual suppression, and in dysmenorrhea. He closes his letter, by observing, "In my opinion it far surpasses ergot, both in its acting more mildly, and with more certain results. It will, no doubt, occupy a very elevated position among remedial agents, when it becomes fully known to the profession." The ordinary dose of the article is from one-fourth of a grain to one grain, two, three, or four times a day. As a parturient it should be given in doses of from two to four grains, and repeated at intervals of from fifteen to thirty or sixty minutes, after actual labor has commenced. In one case, reported, where labor had lasted five days, the patient much enfeebled, and the labor complicated with artificial pains, Caulophyllin was given in two-grain doses every half-hour; but three doses were given, labor having commenced soon after the second was taken, and terminated successfully in one hour and forty minutes from the time the first powder was given. Caulophyllin may be advantageously combined with dioscorein in bilious colic and flatulence. With podophyllin and muriate of ammonia, it forms an excellent combination for some nephritic diseases, accompanied with pains of a spasmodic character.

CEANOTHUS AMERICANUS.

Red-root.

Nat. Ord.—Rhamnaceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This plant, likewise called *New-Jersey Tea*, *Wild Snowball*, has a large root, with a red or brown epidermis, containing many small white veins, and tolerably thick; body of the root dark-red. The *stems* are from two to four feet high, slender, suffruticose, with many reddish, round, smooth *branches*, the younger being pubescent. The *leaves* are ovate or oblong-ovate, acuminate, serrate, three-veined, rather smooth above, downy with soft reddish hairs beneath, often heart-shaped at base. The *flowers* are minute, white, in long, crowded panicles from the axils of the upper leaves. *Calyx* five-cleft, campanulate; cut round after flowering, with the base permanent and adhering to the fruit. *Petals* five, saccate-arched, with long spreading claws. *Stamens* five, exserted, inclosed in the curiously vaulted corolla; *anthers* ovate, two-celled; *ovary*, three-angled. *Fruit* dry, obtusely triangular, three-celled, loculicidal, with papery valves; *cells* one-seeded; *seeds* convex outside, concave within.—*G.*—*W.*

History.—C. Americanus is indigenous to the United States, and is very abundant in the West; it grows in dry woodlands, barrens, etc., flowering from June to August. The leaves are astringent and slightly bitter, and have been used as a substitute for tea, to which they have a strong resemblance when dried, both in taste and odor. The root is the officinal part, and has a taste and smell somewhat resembling those of the peach leaf. It has been occasionally used for coloring. Water extracts its active principle. The leaves are said to contain tannin, a soft resin, a bitter extractive, a greenish coloring matter almost identical in color and taste with green tea, gum, a volatile substance, lignin, and an active principle called *Ceanothine.*

This principle, as stated in the New York Journal of Organic and Medical Chemistry, vol. I., p. 43, is obtained by first removing the resinous extractive, and most of the coloring matter from the leaves, by treating them with alcohol. The mass is then placed in an alembic apparatus, and the alcohol remaining in the leaves displaced, after which the mass is submitted to the percolating process with hot distilled water, until the active principle is displaced. The aqueous solution is then evaporated in *vacuo* to the consistency of thick syrup, and precipitated and purified in alcohol nearly absolute. The precipitate is then placed in *vacuo* at a temperature of about 100° F. By this means the alcohol remaining in the precipitate is gradually removed, and the *Ceanothine* remains in a dried mass partially in the form of crystals, after which it is reduced to a fine powder. When purified it is white; its odor and taste is similar to that of green tea; it is soluble in water, but insoluble in alcohol.

Properties and Uses.—Astringent, expectorant, sedative, antispasmodic, and antisyphilitic. Used in gonorrhea, dysentery, asthma, chronic bronchitis, hooping-cough, and other pulmonary affections. Dose of a strong decoction, one tablespoonful three or four times a day. It has likewise been successfully used as a wash and gargle in the aphthæ of children, sore mouth subsequent to fever, and in ulceration of the fauces attendant on scarlatina.

Off. Prep.—Decoctum Ceanothi.

CELASTRUS SCANDENS.

False Bittersweet.

Nat. Ord.—Celastraceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This plant, likewise known by various other names, as *Staff-vine*, *Waxwork*, *Climbing Bittersweet*, *Climbing Staff-tree*, etc., is a climbing, indigenous shrub, with a woody, twining *stem*, without thorns or prickles; the *leaves* are thin, oblong, acuminate, serrate, alternate, stipulate, petiolate and smooth: the *racemes* are small, terminal, and axillary; the *flowers* are greenish-white, or yellowish-white, fragrant and diœcious. *Calyx* flat, five-lobed; *corolla* spreading, of five sessile petals; *capsule* obtusely three-angled, three-celled, berry-like; *valves* bearing the partitions on their centers; *stamens* standing around a glandular five-toothed disk; *style* thick; *stigma* three-cleft. *Seeds* covered with a scarlet aril, one or two in each cell.—*G.*—*W.*

History.—This plant grows in woods and thickets, from Canada to Carolina, creeping on hedges and rocks, or twining about other trees, or each other, and ascending to a great height. It flowers in June, and bears a scarlet berry which remains through the winter. The plant thrives most luxuriously in a rich, damp soil. The root is very long, creeping, woody, of a bright orange color, about half an inch in thickness, with a thick, red, or yellowish-red bark, which is the officinal part. On account of the similarity of name, Bittersweet, the plant has been confounded with the *Solanum Dulcamara*, from which, however, it essentially differs in appear- and therapeutic action. The bark has a sweetish, rather nauseous taste, and imparts its medicinal properties to water.

Properties and Uses.—Alterative, diaphoretic, and diuretic, with some narcotic powers. Used in scrofula, secondary syphilis, chronic hepatic affections, cutaneous affections, leucorrhea, rheumatism, and obstructed menstruation. Externally, an ointment has been successfully employed in inflamed and indurated breasts of nurses, in prurigo of the vulva, burns, excoriations, etc. Dose of the decoction, from two to four fluidounces, three times a day; of the extract, from five to ten grains.

Off. Prep.—Decoctum Celastri; Syrupus Rumicis Compositus.

CENTAUREA BENEDICTA.

Blessed Thistle.

Nat Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

LEAVES.

Description.—Centaurea Benedicta, or *Cnicus Benedictus* of De Candolle, also known as *Holy Thistle*, is an annual, branched, woolly plant, with a fibrous, whitish root, sending out several roundish, reddish *stems*, one or two feet high. The *leaves* are amplexicaul, somewhat decurrent, nearly entire, pinnated or deeply pinnatifid, more or less hairy; the upper leaves are sessile, the lower petioled. The *flowers* are yellow, in terminal bracteate heads. *Involucre* ovate; *scales* close-pressed, coriaceous, extended into a long, hard, spiny, pinnated appendage; the *lateral spines* conical and distant. *Florets of the ray* sterile, slender, as long as those of the disk. *Fruit* longitudinally and regularly striated, smooth, with a broad lateral scar. *Pappus* triple as it were; the outer being the horny, short, crenated margin of the fruit; the intermediate consisting of ten long stiff setæ; the inner, of ten short setæ; all the setæ alternating with each other.—*L.*

History.—This plant is common to Southern Europe, and has been introduced into this and several other countries. It flowers in June, at which time the leaves should be collected, as the plant is at its highest degree of medical power; they should be thoroughly and speedily dried, and be kept free from moisture, light, and free access of air. Their odor is faint and rather disagreeable, and their taste is exceedingly bitter. Their properties are yielded to water or alcohol, forming a pleasantly bitter draught when infused with the former fluid, but a sickening and repulsive decoction. The leaves yield upon analysis a bitter principle, resin, a fixed oil, gum, sugar, albumen, some salts, etc. The bitter principle is named *Cnicin*, and is supposed to be the active one of the plant; it crystallizes in transparent white needles, which have a bitter taste, are odorless, neutral, unaffected by the atmosphere, are fused and decomposed by heat, slightly soluble in cold, but more so in boiling water, sparingly soluble in ether, but readily in alcohol. In some respects it approaches to salicin and phloridzin; consisting of 62.9 Carbon, 6.9 Hydrogen, and 30.2 Oxygen. Vomiting is produced by it in doses of five or six grains; seven or eight grain doses have proved beneficial in periodical fevers.—*Chem. Gaz., Vol. II., p.* 462.

Properties and Uses.—A cold infusion is tonic; a warm infusion diaphoretic, and if strong, emetic. Used as a tonic in loss of appetite, dyspepsia, and intermittent diseases. Dose of the powder, from ten to sixty grains; of the infusion two fluidounces.

Off. Prep.—Infusum Centaureæ.

CEPHAËLIS IPECACUANHA.

Ipecacuanha.

Nat. Ord.—Cinchonaceæ. *Sex. Syst.*—Pentandria Monogynia.

ROOT.

Description.—Cephaëlis Ipecacuanha is a small plant, with a perennial *root*, descending obliquely into the ground, from four to six inches long, simple or divided into a few diverging branches, about as thick as a goose-quill, ringed, when fresh pale brown, when dry umber-colored, blackish-umber-colored, or grayish-brown; the cortical integument with a reddish, resinous glittering fracture, and readily separating from a central woody axis. The *stem* is suffruticose, from two to three feet long, ascending, often rooting near the ground, smooth and cinereous at the base, downy and green near the apex. The *leaves* are rarely more than four or six on a stem, oblong-ovate, acute, roughish with hairs, from three to four inches long, and from one to two broad; those at the top of the stem are opposite, and those toward the base alternate. *Petioles* short, downy. *Stipules* erect, appressed, membranous, deciduous, four to six cleft. *Peduncles* solitary, axillary, downy, erect when in flower, reflexed when in fruit, about one inch and a half long. *Flowers* small, white, in semiglobose heads, of eight, twelve or more; *involucre* one-leafed, spreading, deeply four to six-parted, with obovate acuminate, ciliated segments. *Bracts* to each flower one, obovate-oblong, acute, downy. *Calyx* minute, obovate; whitish, adhering to the ovary, with five bluntish, short teeth. *Corolla* white, funnel-shaped, *tube* cylindrical, downy on the outside and at the orifice; *limb* shorter than the tube, with five ovate reflexed segments. *Stamens* five; *filaments* filiform, white, smooth; *anthers* linear, longer than the filaments, projecting a little beyond the corolla. *Ovary* with a fleshy disk at the apex; *style* filiform; *stigmas* two, linear. *Berry* ovate, obtuse, about the size of a kidney-bean, at first purple, afterward violet black, two-celled, two-seeded, with a longitudinal fleshy partition. *Nucules* plano-convex, furrowed on the flat side.—*L.*

History.—Ipecacuanha inhabits Brazil, in moist, shady situations, and is also found in other sections of South America, generally between seven and twenty degrees of south latitude (*Ed.*), flowering from December to March, and maturing its fruit between April and June. The root, which is the officinal part, is gathered by the natives from January to April, who, after removing the stem from it, wash it, and dry it by exposure to the solar rays. It is principally imported from Rio Janeiro, in barrels, seroons, and large packages. When brought to this country it consists of bent and contorted pieces, four to six inches long, about the thickness of a goose-quill, generally attenuated toward the base and apex, annulated, rings unequal, commonly of the breadth of half the thickness of the root (*Ed.*), with a grayish-red or grayish-brown, thick, brittle, resinous, and horny bark, yielding a grayish-yellow powder with difficulty, and a slender, pale-yellow meditullium or woody part. The bark is the most active part of the root.

Pharmacologists have divided Ipecacuanha into three varieties, the grayish-black, the grayish-red, and the grayish-white, which are so named from the relative color of the surface of the roots. But as they are obtained from the same plant, and are about the same in properties and constitution, the division is of no practical utility, especially as they are received into this country often so intermixed, as to render a separation of them almost impossible.

Ipecacuanha root is seldom seen by the druggist or practitioner of this country, except in powder, from which circumstance it is much liable to adulteration. The powder of the genuine article is of a grayish-yellow color, with a faint, bitterish, obscurely acrid taste, and a weak, musty, peculiar odor, which becomes stronger and nauseating during the process of pulverization; in some persons it excites sternutation, in others a difficulty of breathing resembling asthma. It yields its properties to water, and still better to alcohol, spirits or wines. Boiling impairs its virtues. The bark of the grayish-black, or dark-brown variety, consists of an odorous concrete oil, wax, gum, starch, lignin, and emetia. The woody part contains but little emetia. The grayish-black variety is supposed to contain more emetia than the grayish-red.

Emetia or *Emetine*, which is the active principle of the root, is prepared by removing the odoriferous fatty oil from the powder with ether, exhausting the residue with boiling alcohol, distilling off the alcohol after the addition of a little water, boiling the filtered liquor with magnesia, washing the precipitate with cold water, exhausting it when dry with boiling rectified alcohol, distilling off the spirit, combining the residue with a very diluted acid, decolorizing the solution with animal charcoal, and then repeating the process from the decomposition with magnesia onward.—*C.—T.*

Pure emetia forms a white, or pale-yellowish, non-crystallizable powder, odorless, nearly tasteless, decidedly alkaline, permanent in the air, insoluble in ether, essential oils, and caustic alkalies, very sparingly so in cold water, but readily soluble in alcohol; at 122° F. it fuses, and at an increased temperature of a few degrees further it decomposes. Nitric acid converts it into oxalic acid. With acids it forms neutral, soluble, bitter, acrid, and for the most part, uncrystallizable salts, whose solutions are precipitated by gallic and tannic acids. It is supposed to consist of 35 equivalents of carbon, 25 of hydrogen, 9 of oxygen, and 1 of azote ($C_{35} H_{25} O_9 N$). The root furnishes but a very small proportion of pure emetia.

Tannic acid, all astringents containing tannic or gallic acids, iodine, salts of iron, and acetate of lead, are *incompatible* with ipecacuanha.

Properties and Uses.—Emetic in large doses; nauseant and expectorant in smaller; and in still smaller doses, tonic, stimulant, carminative and diaphoretic. Some authors suppose it to possess narcotic properties. Given in scruple doses, it operates as an active emetic, causing much nausea, continued muscular straining, with a free secretion of mucus; vomiting, however, seldom takes place, until fifteen or twenty minutes after its administration. It is inferior to no other emetic, being safe even in large doses, seldom producing painful spasms of the stomach or bowels, and causing less prostration of the vital forces than tartar-emetic; it is best employed in combination with other emetics, as in the *Compound Powder of Lobelia*, which is much used by practitioners, and is preferred to any other emetic in the early stage of febrile diseases, and in other instances where a severe succussion of the system is indicated. In spasmodic asthma, hysteria, pertussis, sore-throat, common catarrh, and stricture of the chest common in phthisis, Ipecacuanha as an emetic will be found very beneficial. In menorrhagia, a scruple of the powder at bedtime followed by a saline cathartic in the morning, has, in the hands of several practitioners, promptly checked the discharge. In fevers and inflammatory affections, small diaphoretic doses have been highly beneficial. It will likewise act as a nauseant sedative in all local inflammatory diseases, for which purpose it may be extensively used, and will be found extremely valuable in peritonitis, even the worst form occurring in puerperal women, in pneumonia, in which it will assist expectoration, also in hemorrhages, especially uterine hemorrhages. From three to ten grains will produce nausea, which may be continued for any length of time, and which is attended with more or less depression of the pulse, languor, moisture of the skin, and an increased mucous discharge from all the mucous tissues of the system which renders it very useful in pulmonary and hepatic diseases.

In doses of one-quarter of a grain to one-half, its acts as a tonic, improving digestion, increasing the appetite, and is valuable in some forms of dyspepsia. In doses of half a grain to two grains, administered every three or four hours, it produces perspiration, and is beneficial in febrile and inflammatory diseases; combined with opium its diaphoretic influence is greatly augmented, as seen in the *Powder of Ipecacuanha and Opium.* In diarrhea and dysentery, both acute and chronic, it has been regarded as a valuable remedy, free vomiting being first induced, after which, two or three grains, with occasionally one-eighth of a grain of sulphate of morphia, may be given every four hours. Combined with podophyllin, it increases the activity of that resinoid, and induces perspiration. An excellent remedy for dysentery is, one grain each of leptandrin and Ipecacuanha, and half a grain of podophyllin to be given every three hours until it operates freely. Sometimes Ipecacuanha may be advantageously combined with other emetic agents, as bloodroot, lobelia, etc., to render emesis more prompt, certain, and effectual. In all cases where this drug can not be given by the mouth, it may be used in injection, adding two drachms of the powder to one pint of warm water, for an adult—it will operate kindly and thoroughly as an emetic.

Recently, a liniment of Ipecacuanha has been introduced into practice, for the treatment of incipient phthisis, certain rheumatic affections, chronic hydrocephalus, chronic inflammation of the synovial membrane of the knee, and infantile convulsions. As soon as the pustular eruption appears, the symptoms improve more or less rapidly, until a cure is effected. It is made of powdered Ipecacuanha, sweet-oil, of each, two drachms, lard half an ounce; mix them well together. To be rubbed into the part affected, fifteen or twenty minutes at a time, and to be repeated three or four times daily, covering the part after each rubbing with flannel; in from twenty-four to forty-eight hours the eruption appears. It is stated, that an infusion of two drachms of Ipecacuanha in a gill of hot water, and strained, will, if drank warm, prove emetic; then if the same quantity of hot water is again added to the residue, strained and drank cold, it will prove purgative; and the same process repeated the third time, and used cold, becomes a valuable tonic.

Emetia, the active principle of this drug, is so severe and uncertain in its action, that it is not used in medicine. Two grains of it will kill a large dog. A sixteenth of a grain vomited an old man severely.

Off. Prep.—Pulvis Ipecacuanhæ Compositus; Pulvis Ipecacuanhæ et Opii; Tinctura Serpentariæ Composita; Unguentum Ipecacuanhæ; Vinum Ipecacuanhæ.

CEPHALANTHUS OCCIDENTALIS.

Button-bush.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetranria Monongynia.

THE BARK.

Description.—This plant, sometimes called *Pond Dogwood*, *Globe Flower*, etc., is a handsome shrub growing from six to twelve feet or more high, the bark being mostly rough on the stem and smooth on the branches. The *leaves* are opposite, or in whorls of three, oval, acuminate, entire, smooth, spreading, petioled, with short intervening stipules, and from three to five inches by two to three. The *flowers* are white, terminal, in spherical heads about an inch in diameter, resembling the globular inflorescence of the sycamore (*Platanus Occidentalis*). *Peduncles* long. *Corolla* tubular, slender, four-cleft. *Calyx* tube inversely pyramidal, the limb four-toothed. *Stamens* four; *anthers* yellow; *style* thread-form, much protruded; *stigma* capitate, yellow. *Fruit*, small, hard and dry capsules, inversely pyramidal, two to four-celled, separating from the base upward into two or four closed one-seeded portions.—*G.*—*W.*

History.—Button-bush is indigenous to the United States, and is found in damp places, along the margins of rivers, ponds, etc., flowering from June to September. The bark is the part used, and possesses much bitterness. Water or alcohol takes up its virtues.

Properties and Uses.—Tonic, febrifuge, aperient, and diuretic. The bark has been used with much success in intermittent and remittent fevers; and the inner bark of the root forms an agreeable bitter, which is often employed in coughs, and as a diuretic in gravel. The plant deserves further investigation. It has never been analyzed, but contains some volatile oil, and much bitter extractive.

CERA ALBA.

White Wax.

CERA FLAVA.

Yellow Wax.

History.—Wax is a substance which exists in small quantities in various plants; it is chiefly obtained, however, from the common bee, *Apis Mellifica*, which forms cells, in which its food and ova are contained with wax. It is a natural product of the insect, being secreted upon the abdominal scales or rings. The Wax produced by the bee is the officinal article, of which there are two kinds, Yellow Wax and White Wax.

Yellow Wax is procured directly from the comb, which, after having been deprived of its honey, is fused in boiling water, strained, again fused, and placed in appropriate vessels of various sizes; when cool, the Wax is solidified, and forms the Yellow Wax of commerce. Much of the Wax in our markets is imported from the island of Cuba, but great quantities of it are furnished by several of our own States. It has a grayish-yellow color, a peculiar, rather pleasant odor, and a feeble, characteristic taste. It possesses considerable firmness and tenacity, though somewhat soapy, but not greasy, to the touch; it is brittle, with a short fracture, the fractured surface resembling an aggregation of small grains; it becomes soft by a gentle heat; melts, according to Thompson, at 142° F.; and has a specific gravity varying from 0.960 to 0.965. It is not dissolved by water, alcohol, or ether; the last two, when at 212° F., take up about $\frac{1}{20}$th of Wax, the greater part of which is precipitated as the fluid cools. Yellow Wax is sometimes adulterated with resin, suet, and other substances. Resin may be known by its solubility in cold alcohol. Suet communicates a fatty and disagreeable taste. Meal, etc., may be detected by their insolubility in oil of turpentine.—*P.*—*T.*

WHITE WAX is prepared by exposing thin layers of Yellow Wax to air, sunshine, and moisture, when it loses its color, nearly all of its odor, and becomes yellowish-white. The mode of bleaching Wax is thus described by Pereira: "This is effected by melting Yellow Wax (either in a copper vessel, or in a large vat or tub, by means of steam), running it off, while in a melted state, into a trough, called a *cradle*, perforated at the bottom with holes, and placed over a large water tank, at one end of which is a revolving cylinder, almost wholly immersed in water. By this means the Wax is solidified, converted into a kind of ribbon, and conveyed on the surface of the water to the other end of the tank. These ribbons of Wax are here lifted out, and conveyed in baskets to the bleaching grounds, where they are exposed to the air one or two weeks (according to the state of the weather), being turned every day, and watered from time to time. The Wax is then re-melted, re-ribboned, and re-bleached; it is subsequently refined by melting in water acidulated with sulphuric acid." When finished, it is cut or cast into flat, round cakes, to which a little spermaceti is generally added to improve the color. Chlorine will decolorize Wax, but changes its character. When purified, as above named, Wax is white with a slight tinge of yellow, is odorless, solid, brittle, tasteless, has the specific gravity varying from 0.8203 to 0.9662, softens at about 94° to 96° F., fuses at 155°F., and concretes again at about 148° F. At a high temperature it boils, and in close vessels distills over with little alteration; at a red heat its vapor inflames, burning with a dense white brightness. Boiling alcohol or ether slightly dissolves it, but deposits the most of it upon cooling; cold alcohol or ether, or water do not affect it.—*C.* It readily dissolves in fixed and volatile oils, and combines by fusion with fats and resins; boiled with caustic alkaline solutions it is imperfectly saponified. The ultimate constituents of Wax are twenty equivalents of carbon, twenty of hydrogen, and one of oxygen ($C_{20}\,H_{20}\,O$). When treated with nitric acid, Wax is almost entirely converted into succinic acid. According to Dr. John, Wax consists of two proximate principles, Cerin and Myricin, the former constituting about 70 per cent. of the Wax, fusible at 143°, soluble in boiling alcohol, partly saponifiable by boiling with caustic potassa, and furnishing margaric acid, oleic acid, and an unsaponifiable fatty matter called *Cerain;* the latter fusible at 149°, sparingly soluble even in boiling alcohol, and incapable of undergoing saponification. Lewy and Ettling consider cerin, myricin, and cerain to be isomeric, but Hess affirms they are not distinct principles at all, and that Wax is essentially a single proximate principle. Mr. B. C. Brodie considers *cerin*, when pure, as an acid having the constitution $C_{54}\,H_{54}\,O_4$, and which he terms *Cerotic acid*, which is fusible at 172° F., and on cooling solidifies into a very crystalline body. *Myricin*, when wholly freed from cerotic acid, is saponifiable with difficulty, and from the products of saponification he isolated *Palmitic acid* ($C_{32}\,H_{32}\,O_4$) and a peculiar substance, *Melissine* ($C_{60}\,H_{62}\,O_4$), which he views as a Wax-alcohol, convertible into melissic acid by the loss of two equivalents of hydrogen, and the gain of two of oxygen.

Both Yellow and White Wax are liable to adulterations. Resin may be suspected by the fracture being smooth and shining instead of granular, also by its solubility in cold alcohol. Insoluble substances may be discovered and separated by melting and straining the Wax. Tallow and suet, by the greasiness imparted, by the softness they communicate to the Wax, and its greater fusibility; also by its unpleasant odor when melted. Fatty matters may also be detected by their rendering hot lime-water turbid, when agitated with chips of the suspected Wax, and then allowed to rest. Chloroform dissolves stearin and stearic acid completely, but only 25 per cent. of Wax; then, if Wax, treated with six or eight parts of chloroform, loses more than one-fourth of its weight, it is impure. If the Wax contains starch, boil it in water and add tincture of iodine to it, which will produce a blue color. (*For Myrtle Wax see Myrica Cerifera.*)

Properties and Uses.—Wax exerts little or no influence upon the system, though it has been recommended in diarrhea, dysentery, and inflammation of the alimentary mucous membrane combined with olive oil, and the yolk of egg. Its principal employment is in the preparation of ointments, cerates, and plasters, of which it forms an ingredient, imparting to them due consistence and tenacity.

CEREVISIÆ FERMENTUM.

Yeast.

Preparation.—When an infusion of malt (barley steeped in water, fermented, and dried in a kiln), technically called Wort, is subjected to the process of fermentation, a dirty, grayish-brown substance, gradually separates, forming in part a frothy scum, and partly a sediment; this is Yeast, or Barm.

History.—Yeast is a thick, glutinous, foamy-like fluid of a wine-acid odor, and a rather unpleasant taste; it is a very mixed substance, containing water, alcohol, carbonic, acetic, and malic acids, potassa, lime, and saccharo-mucilaginous extract. When exposed to a moist air, or to a temperature above 59°F., it rapidly decomposes; but when subjected to a gentle heat, so as to dissipate its watery parts, it forms a fragile solid, which may be kept without change for a considerable time, but with a diminution of its fermentative properties. Neither water nor alcohol dissolve Yeast. Its most important property is, that when placed in contact with saccharine solutions at a temperature between 50° and 80° F., it excites vinous fermentation in them, converting their sugar into carbonic acid and alcohol. Dr. Christison, by means of Yeast, has been able to detect one part of sugar in 1,000 parts of urine, of specific gravity 1.030, and which is due to its cryptogamic cellular growth, being favored by the presence of sugar, and which may be seen under an achromatic microscope. The cells appear as small, ovoidal, ellipsoidal, or somewhat pyriform, transparent, nucleated, varying in size from 1-7500th to about 1-2500th of an inch.—*P.* The fermentative power of Yeast is much impaired by drying it; a heat of 212° F. destroys it, as well as the addition of some of the concentrated acids, undiluted alcohol, or by continued trituration until all the vesicles have burst and lost their structure.—C. It is also destroyed by boiling water, pyroligneous acid, salts of mercury, essential oils, etc. For some interesting remarks on fermentation, by M. Pasteur, see Am. Jour. Pharm. XXX., 328.

Properties and Uses.—Stimulant, tonic, nutritious, antiseptic, and laxative. Used in typhoid fevers by mouth and injection, and in tympanitis by enema. In all malignant ulcerations of the throat and mouth, in diseases where there is a disposition to putridity, in scarlatina, and low stages of fever, with or without the addition of olive-oil, which renders it more laxative, it will be found highly beneficial. Externally, in combination with elm bark and charcoal, it forms an excellent emollient and antiseptic poultice in sloughing ulcers, stimulating the vessels, removing the tendency to gangrene, and correcting the fetor.

In the recent furunculoid epidemic which existed in this country and Europe, given internally, in conjunction with quinia, Yeast was found effectual in the treatment of boils, carbuncles, and felons. The dose of Yeast is from half a fluidounce to a fluidounce, every two or three hours.

Yeast has been advised in diabetes mellitus in doses of a fluidrachm three or four times a day, taken immediately before meals. It has in some instances proved efficacious, and is supposed to act by decomposing sugar or preventing its abnormal production in the stomach.

Off. Prep.—Cataplasma Fermenti.

CETACEUM.

Spermaceti.

A CONCRETE SUBSTANCE OBTAINED FROM THE OILY MATTER OF THE SPERMACETI WHALE.

Preparation.—Spermaceti is obtained from the Cachalot or Sperm whale, the *Physeter Macrocephalus* of naturalists, a species of the family *Cetacea;* it is a gregarious animal, inhabiting the Pacific ocean, the waters of the Indian Archipelago, and the Chinese seas. It varies in size, being from fifty to eighty feet in length, with a huge, quadrangular head, from twenty to thirty feet, or more, in circumference, and which constitutes about a third of its whole length. Spermaceti is found in various parts of its body, in small proportions, dissolved in its blubber, but that which is met with in commerce, is obtained from large cavities in the upper part of the head; these are divided into numerous cells, which are filled with a milky, oleaginous solution of spermaceti. From a large whale forty to sixty hundred weight of this fluid may be collected. It is removed from the cavities and boiled to separate the oleaginous matter from the solid substance, and as it cools, the Spermaceti crystallizes. The oil is then drained off as much as possible, and the remainder is removed from the Spermaceti by powerful pressure. The crude Spermaceti is subsequently purified by fusing and skimming it, then fusing it in weak lye of potassa, and finally by a third fusion at a gentle heat; after which it is solidified in tin molds.

History.—Spermaceti is a concrete, crystalline, foliaceous, pearly-white substance, without much taste or odor, easily indented or scraped by the nail, slightly greasy, pulverizable on the addition of a little alcohol, or almond-oil, fusible at 112°, combustible, insoluble in water, sparingly soluble in cold alcohol, but more so in oil of turpentine, ether, and boiling alcohol, which deposit it on cooling, and freely soluble in fixed and volatile oils, and fused fats or resins. It is soluble in sulphuric acid, which decomposes it, but the other mineral acids do not influence it. Exposed for a length of time to atmospheric influence, it becomes yellow and rancid, owing to a small portion of oil contained in it, but it may be purified by boiling in alcohol, which deposits the pure Spermaceti as it cools. By this method, or when it is deprived of oil by means of an alkali, it becomes a pure proximate principle, intermediate between wax and the concrete oils, and presenting all the leading properties of the ordinary article, but less unctuous, rather harder, and fusible only at 120° ; it is then termed *Cetin*, and is soluble in forty parts of boiling alcohol of sp. gr. 0.821. When boiled in a solution of caustic potassa, Cetin is partially saponified, forming a brittle soap, composed chiefly of margarate of potassa, oleate of potassa, and a crystalline principle called Ethal, and which soap is not wholly soluble in water. Cetin is a compound of Ethal (hydrated oxide of cetyle), with ethalic or cetylic acid ($C_{32}\,H_{31}\,O_3\,HO$). When melted or dissolved in hot alcohol it crystallizes beautifully ; when acted on by nitric acid, it yields first, pimelic acid ($C_7H_6O_4$) ; which is then oxidized into adipic acid ($C_{14}\,H_{12}\,O_{10}$), which is finally converted into succinic acid ($C_4\,H_2\,O_3, HO = \ddot{S}, HO$). Cetin or pure Spermaceti consists of 81.66 per cent. of Carbon, 12.86 Hydrogen, and 5.48 Oxygen.

Properties and Uses.—Demulcent, much used among children in domestic practice in coughs, colds, and catarrhal affections, combined with equal parts of loaf-sugar; and in irritations of the intestinal mucous membranes. If to Spermaceti be added half its weight of olive-oil, and after mixing this, powdered gum Arabic be added, and finally, some water be added by degrees, an emulsion may be formed, useful for children and infants. Hollandt states that Spermaceti may be reduced to the most impalpable powder, by melting it over a gentle fire, and then stirring it in a previously warmed mortar until cold.

Spermaceti forms a useful ingredient of several cerates and ointments. It enters into the formation of a crayon which is of much value to chemists, druggists, and others, inasmuch as it enables them to write upon clean glass, the contents of bottles, etc., as labels or otherwise. It is made by fusing in a cup four drachms of Spermaceti (or stearine), three drachms of tallow, and two drachms of wax ; after which six drachms of red-lead, and one drachm of potassa are to be stirred into it, keeping the whole mass warm for half an hour, and then pour it into glass tubes the thickness of a lead pencil. After rapid cooling, the mass may be screwed up and down in the tube, and cut to the finest point with a knife.

Off. Prep.—Ceratum Cetacei ; Unguentum Aquæ Rosæ ; Unguentum Cetacei.

CETRARIA ISLANDICA.

Iceland Moss.

Nat. Ord.—Lichenaceæ. *Sex. Syst.*—Cryptogamia Lichenes.

Description.—Iceland Moss is a perennial, foliaceous plant, from two to four inches high ; *thallus* erect, tufted, olive-brown, paler on one side, laciniated, channeled, and dentato-ciliate, the fertile laciniæ very broad. *Shields* brown, appressed, flat, with an elevated border.—*L.*

History.—This lichen is a native of Britain and the northern countries of Europe, particularly Iceland. It is diversified in color, being brownish or grayish-white on some parts, and of a reddish hue in others; it is without odor, with a mucilaginous, bitter, somewhat astringent taste, and when dry, the lichen is crisp, cartilaginous, and coriaceous, and is convertible into a grayish-white powder. It swells up in water, absorbing more than its own weight of that fluid, communicating a portion of its bitterness to it, as well as a little mucilage. When long chewed it is converted into a mucilaginous pulp, and when boiled in water the decoction becomes a firm jelly on cooling. Iceland Moss consists of starchy lignin, a peculiar starch, gum, uncrystallizable sugar, chlorophylle, wax, various salts, and a bitter principle called *Cetrarin*, or *Cetraric* acid, which it is said is used in Italy instead of Cinchona. Christison states that it may be obtained pure "by boiling the coarsely powdered lichen in four times its weight of rectified alcohol, filtering the solution when tepid, acidulating it with dilute muriatic acid, diluting it with thrice its volume of water, and purifying the crystals which slowly form, by squeezing them, and washing them with a little ether." As thus obtained, Cetrarin is white, permanent, odorless, intensely bitter, insoluble in water, sparingly so in cold alcohol, more so in boiling alcohol, or ether, and readily soluble in alkaline solutions. About 68 grains of Cetrarin have been obtained from half a pound of the lichen. When its alkaline solutions are treated with acids, the Cetrarin is procured without being changed in its properties; concentrated hydrochloric acid converts it into a blue coloring matter. It consists of cetraric acid, lichstearic acid, and thallocor, and is said to prove an efficacious febrifuge in two or three grain doses, administered every two or three hours. The most important part of Iceland Moss, is its nutritive principle, to which the name of *Lichenin* has been given. It may be obtained by macerating the chopped lichen for twenty-four hours, in eighteen parts of water, containing a 250th of its weight of carbonate of potassa—strain off the bitter solution without pressure, and remove the rest of it from the residuum by maceration with cold water, and simple straining. Boil the residuum in nine parts of water down to six, strain the decoction, and squeeze what is left in the cloth, and then allow the strained liquor to cool. A firm jelly is formed, which cracks and throws out much of the water, and then dries into a hard, black, glassy-like substance. The black coloring-matter may be removed by boiling again, straining, cooling, and drying; upon which the lichenin is obtained in thin, transparent, and tough plates of a yellowish color. Cold water renders it gelatinous, boiling water dissolves it, forming a jelly on cooling; alcohol and ether do not affect it. Iodine renders its watery solution blue, and it is converted into sugar by sulphuric acid, and into oxalic acid by nitric acid. It consists of Carbon, Oxygen, and Hydrogen, and in some respects resembles amidin.

Properties and Uses.—Demulcent, tonic, and nutritious. Used as a demulcent in chronic catarrhs, chronic dysentery, and diarrhea, and as a tonic in dyspepsia, convalescence, and exhausting diseases. Boiled with milk it forms an excellent nutritive and tonic in phthisis, and general debility. Its tonic virtues depend upon its cetrarin, which, if removed, renders the lichen merely nutritious.

Off. Prep.—Decoctum Cetrariæ.

CHELIDONIUM MAJUS.

Great Celandine.

Nat Ord.—Papaveraceæ. *Sex. Syst.*—Polyandria Monogynia.

HERB AND ROOT.

Description.—This plant, sometimes known as *Tetterwort*, is an evergreen perennial, with a *stem* from one to two feet in height, branched, swelled at the joints, leafy, round, smooth. The *leaves* are smooth, spreading, very deeply pinnatifid; *leaflets*, in from two to four pairs, from one and a half to two and a half inches long, and about two-thirds as broad, the terminal one largest, all ovate, cuneately incised or lobed; the lateral ones sometimes dilated at their lower margin, near the base, almost as if auricled; color of all a deep shining green. *Flowers* bright-yellow, umbellate, on long, often hairy stalks. *Umbels* thin, axillary, pedunculate. *Calyx* tawny, often hairy. *Petals* four, entire, yellow, and very fugacious. *Stamens* numerous. *Capsules* long, torulose, two-valved, one-celled. *Seeds* black and shining, each with a whitish deciduous crest.—*L.*

History.—Celandine is a pale-green, fleshy herb, indigenous to Europe, and naturalized in this country; it grows along fences, by road-sides, in waste places, etc., and flowers from May to October. When the plant is wounded a bright-yellow, offensive juice flows out, which has a persistent, nauseous, bitter taste, with a biting sensation in the mouth and fauces The root is the most intensely bitter part of the plant, and is more commonly preferred. Drying diminishes its activity. It yields its virtues to alcohol or water. Analysis has detected in this plant a deep-yellow, bitter, resinous substance, an orange-colored, nauseous, and bitter gum-resin, mucilage, albumen, free malic acid, silica, and various salts. More recently, a peculiar acid has been detected in it, termed *Chelidonic acid;* an alkaline principle, forming neutral red salts with acids, which are narcotic and poisonous, denominated *Chelerythine;* it is a gray powder, and excites violent sneezing when snuffed into the nostrils; another alkaline principle, bitter, insoluble in water, and forming crystallizable salts, called *Chelidonin*, (C_{40} H_{20} N_3 O_6); and lastly a neutral, yellow, crystallizable, bitter principle, termed *Chelidoxanthin.*

Chelerythin may be obtained by forming a strong ethereal tincture of the Celandine root; through this pass muriatic acid gas, and dry the precipitated muriate which is insoluble in ether. Then dissolve it in hot ter, filter, precipitate by ammonia, dry the precipitate, dissolve it in ether, decolorize by animal charcoal, again precipitate by muriatic acid gas, and decompose, the muriate, by ammonia, as before.

Properties and Uses.—Stimulant, acrid, alterative, diuretic, diaphoretic, and purgative Used internally in decoction or tincture, and externally in poultice ointment, for scrofula, cutaneous diseases, and piles. Likewise useful in hepatic affections, and is supposed to exert a special influence on the spleen. As a drastic hydragogue it is fully equal to gamboge. The juice, when applied to the skin, produces inflammation, and even vesication, and has long been known as a caustic for the removal of warts; also applied to indolent ulcers, fungous growths, etc., and is useful in removing specks and opacities of the cornea, and in curing ringworms. Dose of the powdered root, from half a drachm to one drachm; of the fresh juice, from thirty to forty drops, in some bland liquid; of the tincture, from one to two fluidrachms; of the aqueous extract, from five to ten grains.

Off. Prep.—Decoctum Chelidonii.

CHELONE GLABRA.

Balmony.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES.

Description.—This plant, likewise known by the names of *Snakehead*, *Turtlebloom*, *Turtlehead*, *Salt-rheum weed*, etc., is a perennial, smooth, herbaceous plant, with a simple, erect, somewhat four-sided *stem*, about two or three feet high. The *leaves* are opposite, sessile, or nearly so, smooth, oblong-lanceolate, acuminate, serrate, and of a dark shining green above. The *flowers* are large, inodorous, white, rose-color, or purple, subsessile, in a short, terminal, dense spike, somewhat resembling the head of a snake or tortoise; *corolla* inflated, bilabiate, contracted at the mouth, the upper lip broad and arched, and keeled in the middle, the lower woolly within; *calyx* deeply five-parted, with three bracts at base. *Stamens* four, with hairy filaments and hairy cordate anthers, and a fifth sterile filament smaller than the others; *ovary* ovate; *style* long, exsert, bending downward. *Fruit* an oval, two-celled, and two-valved capsule, with many small wing-margined seeds.—*W.*—*G.*

History.—This valuable medicinal plant is found in the United States in damp soils, flowering in August and September. The flowers are very ornamental, and vary in color according to the variety of the plant, there being many varieties. The leaves are exceedingly bitter, but inodorous, and communicate their properties to both water and alcohol. No analysis has been made of them.

Properties and Uses.—Tonic, cathartic, and anthelmintic. Especially valuable in jaundice and hepatic diseases, likewise for the removal of worms, for which it may be used in powder or decoction, internally, and also in injection. Used as a tonic in small doses, in dyspepsia, debility of the digestive organs, and during convalescence from febrile and inflammatory diseases. Recommended in form of ointment as an application to painful and inflamed tumors, irritable and painful ulcers, inflamed breasts, piles, etc. Dose of the powder one drachm; of the tincture, one or two fluidrachms; of the decoction, one or two fluidounces.

Off. Prep.—Decoctum Chelonis.

CHENOPODIUM ANTHELMINTICUM.

Wormseed.

Nat. Ord.—Chenopodiaceæ. *Sex. Syst.*—Pentandria Digynia.

SEEDS.

Description.—This plant, known also by the name of *Jerusalem Oak*, has a perennial and branched *root*, with an erect, herbaceous, much-branched, furrowed *stem*, rising from one to three feet in height. The *leaves* are alternate or scattered, oblong-lanceolate, toothed, sinuate, nearly sessile, distinctly veined, attenuated at both ends, of a yellowish-green color, and marked beneath with small, resinous atoms. The *flowers* are very numerous, small, of the same color as the leaves, and arranged in long, slender, axillary, or terminal racemes; *calyx* with five, ovate, concave, permanent segments; *stamens* five, opposite to the segments of the calyx, and about as long, with awl-shaped filaments; *styles* two or three, short; *ovary* orbicular, depressed; *seeds* solitary, lenticular, crustaceous, covered by the permanent, five-angled calyx.—*L.*

History.—Chenopodium is found growing in waste places in almost all parts of the United States, flowering from July to September, and ripening its seeds throughout the autumn, at which time they should be collected. The whole plant has a strong, unpleasant odor, which is owing to its essential oil; when first obtained, it is of a light straw-color, but gradually acquires a darker hue. The seeds contain a large quantity of this oil, which is obtained from them by distillation. The whole plant is occasionally employed, but the seeds only are officinal. When dried, they are of a greenish-yellow or brownish color, irregularly spherical, very small, very light, and have a bitterish, warm, pungent taste, with the peculiar odor of the plant.

Properties and Uses.—Anthelmintic and antispasmodic. It is used in various forms to expel the lumbrici in children, as the expressed juice, electuary, or decoction. The dose of the juice is a tablespoonful repeated night and morning; of the infusion, prepared by infusing an ounce of the recent plant in a pint of milk, with the addition of some aromatic, a wineglassful; of the electuary, made by thoroughly mixing the pulverized seed in honey or syrup, one or two scruples. But the essential oil, on which the vermifuge properties depend, is the best form, and is more generally employed. Its dose is from four to eight drops mixed with sugar, or in emulsion, to be given morning and evening, for four or five days successively, and then, as with the other forms of administration, it should always be followed by a purgative. It is used in various combinations. Take of oil of Wormseed and tansy, of each one ounce, spirits of turpentine one ounce and a half, castor-oil one pound. Mix. Dose, for a child, a teaspoonful every hour, until it operates; for an adult, a tablespoonful. The oil has likewise been reputed beneficial in amenorrhea.

The *C. Ambrosoides*, which has been successfully used in chorea, and the *C. Botrys*, which has been used with advantage in catarrh and humoral asthma, as an expectorant, are both indigenous, and though less powerful, possess somewhat similar properties; and, indeed, from the superior powers of the *C. Anthelminticum*, it might possibly be found of more benefit in these affections, than the above.

Off. Prep.—Oleum Chenopodii; Mistura Chenopodii Composita; Mistura Olei Composita.

CHIMAPHILA UMBELLATA. (*Pyrola Umbellata.*)

Pipsissewa.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WHOLE PLANT.

Description.—This plant is known by various other names, as *Wintergreen*, *Prince's Pine*, *Ground-Holly*, etc.; it is a small evergreen, nearly herbaceous, perennial herb, with a creeping, yellowish *rhizoma*, from which are sent several simple, erect, or semi-procumbent *stems*, somewhat angular, marked with the scars of former leaves, and woody at their base; they grow from four to eight inches in height. The *leaves* are in two or more irregular whorls, from two to three inches long, and about one-fourth as wide, cuneate-lanceolate, acute at the base, sharply serrate, on short petioles, coriaceous, shining, of a uniform dark-green color, paler below, and not spotted. The *flowers* are corymbose, nodding, of a light-purple color; the *pedicels* with linear-subulate bracts about their middle, eight lines long. *Calyx* small, consisting of five roundish, acute teeth or segments, much shorter than the corolla. *Corolla* is composed of five roundish, concave, spreading, cream-colored petals, exhaling a fragrant odor, and tinged at the base with purple. *Stamens* ten, hypogynous; *filaments* sigmoid, the lower half fleshy, triangular, dilated, and slightly pubescent at the edges; the upper half filiform. *Anthers* two-celled, each cell opening by a short, round, tubular orifice, which points downward in the bud, but upward in the flower. *Pollen* white. *Ovary* globular, depressed, furrowed, obscurely five-lobed, with a funnel-shaped cavity at top, and supporting a large, peltate, convex, obscurely five-rayed *stigma*. *Style* short, straight, half as long as the ovary, inversely conical, inserted in the cavity of the ovary, and concealed by the stigma. *Capsule* erect, depressed, five-celled, five-valved, the partitions from the middle of the valves. *Seeds* numerous, linear and chaffy.—*L.*—*W.*—*G.*

History.—This little herb is indigenous to the north temperate regions of both hemispheres, and is met with in the United States in dry, shady woods, flowering from May to August. The leaves have no odor when dried, but when fresh and rubbed they are rather fragrant; their taste is astringent, sweetish, and not disagreeably bitter. The whole herb is used. Boiling water, or alcohol extracts the active properties. The plant contains a large proportion of bitter extractive, an acrid and volatile principle, resin, gum, lignin, and saline substances.

Properties and Uses.—Diuretic, tonic, alterative, and astringent. The fresh leaves when bruised and applied to the skin, act as vesicants and rubefacients. It is especially useful in scrofula, and chronic rheumatic and nephritic affections. The decoction alone has cured ascites, and has been advantageous in strangury, chronic gonorrhea, and catarrh of the bladder; and as an antilithic it is said to diminish lithic acid in the urine. In dropsy it can not be depended upon without the use of other more active measures, and is better adapted to cases accompanied with weakness and loss of appetite. In urinary disorders, it may be used as a substitute for the uva ursi, to which it is preferable on account of being less obnoxious to the stomach. In many cutaneous diseases, it has proved very efficacious. Dose of the decoction, from one to four fluidounces three times a day; of the extract, from ten to twenty grains, three or four times a day; a syrup may be prepared, by macerating four ounces of the finely-bruised leaves, in eight fluidounces of water for thirty-six hours, then subject the whole to percolation till a pint of fluid is obtained, evaporate to half a pint, and add twelve ounces of sugar. Dose, one or two tablespoonfuls.

The *Chimaphila Maculata*, or *Spotted Wintergreen*, may be known from the above by its leaves, which are opposite, or in threes, lanceolate, acuminate, rounded at the base, where they are broader than near the summit, remotely serrate, of a deep olive-green color, and veined with greenish-white. The *C. Umbellata* leaves are broader near the summit, tapering toward the base, of a uniform shining green color, serrated, and not marked with the whitish line along the mid-vein and veinlets.

The *C. Maculata* is probably possessed of similar powers with the officinal article, and may be used as a substitute. An extract of it is reputed to have cured epilepsy.

Off. Prep.—Decoctum Chimaphilæ; Syrupus Stillingiæ Compositus.

CHIOCOCCA RACEMOSA.

Cahinca.

Nat. Ord.—Cinchonaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE BARK OF THE ROOT.

Description.—A somewhat climbing shrub, with a round, branched root, and a *stem* eight to twelve feet high, arborescent, branches opposite. The *leaves* are ovate, pointed, smooth, with an uninterrupted margin; *stipules* short, pointed, joined together at base. The *flowers* are white and without odor, but subsequently become yellowish and redolent, and are in short, axillary, one-sided racemes. *Calyx* five-cleft. *Corolla* funnel-shaped; *stamens* five. *Berry* white, small, roundish, compressed. The *C. Anguifuga* and *C. Densifolia* are varieties possessing similar properties.

History.—This plant, sometimes called *Snowberry*, is a native of the West Indies, South America, and also of the sea-coast of Florida. The root, as found in commerce, is in small round pieces of different sizes and lengths, flexuous, with longitudinal rugæ and a few rough spots, having its thin cortical portion, of a reddish-brown color, fragile, of a disagreeable odor, and a coffee-like taste, succeeded by a pungent nauseousness; its internal woody portion is without taste. The bark is the officinal part, and yields its properties to water or alcohol. Besides *Cahincic Acid* it contains according to Pelletier gummy, oily and coloring matters, the nature of which is not well understood. Its most important medicinal constituent is the Cahincic Acid.

Properties and Uses.—In medium doses it augments the urinary discharge, slightly accelerates the action of the heart, and increases the peristaltic action of the bowels; and if the body be kept warm, and warm infusions be drank, instead of purging it will produce perspiration. In large doses it produces the most violent emetic and drastic effects. It has been found efficient in dropsy, amenorrhea, rheumatism, syphilis and osteocopus, and in Brazil is used as an antidote to poisonous snake bites. From twenty to sixty grains of the powdered root-bark will act as a purgative and diuretic; or from ten to twenty grains of an aqueous or spirituous extract. It may also be used in decoction or tincture.

CHIONANTHUS VIRGINICA.

Fringe Tree.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

BARK OF THE ROOT.

Description.—This is a shrub or small tree, growing from eight to twenty-five feet high; the *leaves* are opposite, deciduous, oval, oblong or obovate-lanceolate, entire-petioled, coriaceous, veiny, smooth, but in one variety, C. *Maritima*, rather downy. The *pedicels* are long, slender, and one flowered; the *flowers* are in dense, pendulous panicles, the *calyx* being very small, four-parted, persistent, and the *corolla* consisting of four long and linear petals about an inch long, acute, snow-white; *stamens* two, very short, on the base of the corolla; *style* very short; *stigma* notched. The *drupes* are fleshy, oval, purple, with a bloom, one-seeded; *putamen* bony; *seeds* not albuminous; *cotyledons* large and thick.—*G.*—*W.*

History.—The Fringe-tree is a beautiful ornamental plant, much cultivated in gardens; it grows from Pennsylvania to Tennessee, on river-banks and on elevated places, presenting light clusters of snow-white flowers in May and June. It is also known in some sections by the names of *Old Man's Beard*, *Poison Ash*, etc. The bark of the root is the part used, and imparts its properties to water, or alcohol.

Properties and Uses.—Aperient, alterative, and diuretic, with some narcotic properties; an infusion of the root-bark has been efficacious in bilious and typhoid fevers, as well as in obstinate intermittents. It forms an excellent tonic after convalescence from exhausting diseases. As a poultice it will be found an excellent local application in external inflammations, ulcers, and wounds. Dose, from half a fluidounce of the infusion to two fluidounces, repeated several times a day, according to its influence upon the system.

CHLOROFORMUM.

Terchloride of Formyle.

CHLOROFORM.

Preparation.—"Take of Chlorinated Lime, *four pounds;* Rectified Spirit, *half a pint;* Water, *ten pints;* Chloride of Calcium, broken into pieces, *one drachm.* (The fluids are Imperial measure). Put the chlorinated lime, first mixed with the water, into a retort, and add the spirit to them, so that the mixture may fill only the third part of the retort. Then heat them in a sand-bath, and as soon as ebullition begins, withdraw the heat as quickly as possible, lest the retort should be broken by the sudden increase of heat. Let the liquid distill into the receiver so long that there may be nothing which subsides, the heat being reapplied if necessary. To the distilled liquid add a quarter of the water, and shake them all well together. Carefully separate the heavier portion which subsides, and add the chloride to it, and frequently shake them for an hour. Lastly, let the liquid distill again from a glass retort into a glass receiver."—*Lond.*

Wittstein gives the following process and remarks upon it: "In a copper or iron still, which must be only half-filled, there are placed fifty parts of chloride of lime, one hundred parts of water, and three parts of alcohol of 90 per cent.; all are to be well stirred together, and the head luted on; with the still is connected a well-cooled worm, to which is attached a glass receiver, but not air-tight,—and the still is then heated. So soon as the first portion begins to distill, all the fire is withdrawn from the furnace, and if the distillation proceeds too rapidly, the head of the still must be cooled with wet cloths. When the product ceases to come over in a continuous stream, the fire is again added; the receiver is to be withdrawn as soon as it contains eight parts. If the distillate reddens or bleaches blue litmus paper, which is, however, not generally the case, it must be treated with small portions of hydrate of lime, and be poured into a narrow, high, cylindrical glass, and when it has separated into two layers of liquid, the upper portion is removed by means of a syphon or pipette, while the under portion is treated with half its weight of powdered anhydrous chloride of calcium, and distilled with a gentle heat to dryness; the distillate to be kept in a well-stopped bottle and cool place. The yield will be two or two and a half parts.

"Chloride of lime consists of a mixture of about 50 per cent. hydrate of lime $=$ Ca O$+$HO, 22 per cent. chloride of calcium $=$ Ca Cl, and 28 per cent. of hypochlorite of lime $=$ Ca O$+$Cl O; which corresponds to four equivalents of lime, one chloride of calcium, and one hypochlorite of lime. These proportions vary in the commercial article, arising partly from bad preparation in the first place, from age, or not having been kept in well closed vessels. The bleaching properties of chloride of lime, and consequently its value, depend on the hypochlorite of lime it contains. As in the preparation of chloride of lime equal equivalents of hypochlorite of lime and chloride of calcium are always formed; so, in the fresh state, the chloride of lime, let its bleaching powers be what they may, always contains the two chlorides in this proportion. When by long exposure to the air its bleaching properties have become weaker, the chloride of calcium will be found to be increased at the expense of the hypochlorite of lime; it readily attracts moisture from the air passing into a wet slimy mass.

"Anhydrous alcohol consists of $C_4\ H_6\ O_2$. In contact with chloride of lime and the necessary amount of water, the action that ensues is due to the hypochlorite of lime; the chloride of calcium is an indifferent body, and the part taken by the hydrate of lime is only a secondary one, to saturate a portion of the products formed. The result teaches that in Chloroform $= C_2\ H\ Cl_3$, only the fourth part of the carbon contained in alcohol is retained; from the other three-fourths is formed formic acid $= C_2\ HO_3$; and as the Chloroform and formic acid have one and the same radical (C_2 H), 2 equivalents of alcohol form 1 of Chloroform, and 3 of formic acid. From the alcohol are separated 8 equivalents of hydrogen, which are replaced by 3 eqs. of chlorine, and 5 eqs. of oxygen, yielding Chloroform and formic acid. The chlorine, as well as the oxygen required for the oxidation of the hydrogen, is furnished by the hypochlorite of lime, the base of which serves at the same time to neutralize the formic acid.

"1,150 parts of anhydrous, or 1,280 parts of alcohol of 90 per cent., require 7,944 parts of pure hypochlorite of lime, or 28,371 parts of chloride of lime; or 1 part of alcohol, 90 per cent., requires at least 22 parts of chloride of lime, and forms one part of Chloroform. Some experiments I have made show, however, that when to 22 parts of chloride of lime only one part of alcohol is taken, a considerable quantity of chloride of lime is lost, as from the action of the heat some of the alcohol volatilizes unacted on; in consequence of this, 3 parts of alcohol are ordered to 50 parts of chloride of lime. Should the mixture contain an excess of hypochlorite of lime, this has a decomposing action on the formiate of lime; chloride of calcium, carbonate of lime, free carbonic acid, and water, separate.

"So soon as the mixture is heated to 176° F., it experiences a very violent reaction, the mass froths up, and would certainly come over if the retort were more than half filled; even when such is the case, this is not quite impossible, and consequently the fire must be immediately withdrawn, and, if necessary, the still-head cooled; only when the effervescence has subsided, which is known by the distillate coming over more slowly than at first, may fire be again applied, in order to draw over the remainder of the Chloroform. When about two and a half times the volume of the alcohol has distilled over, the distillate will contain all the Chloroform, and what now passes into the receiver will have a weak watery taste. The distillate consists of two layers, the lower of which is the Chloroform, the upper the water, containing all excess of alcohol and a trace of Chloroform. If several batches of Chloroform are to be prepared, this watery portion need not be thrown away, but reserved for the next mixture, to which it is then necessary to add only two and a half parts of alcohol instead of three parts. In order to withdraw any traces of water that may adhere to the Chloroform, it is rectified over chloride of calcium. The residue in the still may be treated like that from the manufacturer of caustic ammonia, and used for chloride of calcium."

History.—The first discovery of Chloroform was in 1831, by Mr. Samuel Guthrie, a chemist residing in Sackett's Harbor, N. Y.; subsequently, in 1832, Souberain, of France, and Liebig, of Germany, prepared it; neither of these gentlemen being aware of the other's discovery. It is a transparent, colorless, very volatile, neutral fluid, of specific gravity varying from 1.48 to 1.5, having a peculiar, ethereal, apple-like odor, and an ethereal, slightly acrid, and very sweet taste. It is soluble in 2,000 parts of water, readily soluble in alcohol or ether, does not burn, but imparts to the flame of an alcohol lamp a yellow sootiness, and boils at 142° F. A large amount of water added to its alcoholic solution, decomposes it, setting the Chloroform free at the bottom of the liquid. It does not coagulate albumen, and exerts no influence on potassium when it is pure. It is a Terchloride of Formyla, and has the formula $C_2\ H,Cl_3$.

Chloroform is a powerful solvent, and is thus a most valuable auxiliary to the chemist and pharmaceutist, and is preferable to ether in many instances on account of its non-inflammability, and in some instances it is superior to alcohol. According to M. Lepage, the following is the solvent power of Chloroform in relation to various bodies; Mastic, colophony, elemi, tolu, and benzoin, are dissolved in all proportions, forming solutions, some of which might prove useful as varnishes. Copal and caoutchouc also dissolve, but more readily hot than cold. Amber, sandarac, and shell-lac are only partially dissolved, either with or without heat. Their constituent resins may be thus separated. Olibanum dissolves but slightly, hot or cold. Guaiacum and scammony resin dissolve readily, while jalap resin is insoluble ; it merely softens and floats on the surface like pitch. Gamboge and dragon's blood yield some substance and their fine color to the solvent, and might be advantageously used as varnishes. Fixed oils and fats dissolve readily, in all proportions. Wax yields 25 per cent. of soluble matter to this solvent. All volatile oils are soluble. Iodine, bromine, phosphorus, and sulphur are soluble, the two last only slightly. Styracin, piperin, naphthalin, cholesterin, and cantharidin are very soluble ; picrotoxin, slightly so ; paraffin only when hot, separating as the liquid cools ; while amygdaline, phloridzin, salicin, digitalin, cytisin, urea, hematin, gluten, and sugar are insoluble. Benzoic and hippuric acids are very soluble, tannic but slightly, and tartaric, citric, oxalic, and gallic acids are insoluble. Quinia, veratria, emetia, narcotina, nicotina, conia, and atropia are easily soluble, strychnia with less readiness, and appears to undergo a change in its morphic condition ; brucia is moderately soluble, but morphia and cinchonia are insoluble. Tartar emetic, citrate and lactate of iron, the acetates of soda and potassa, valerianate of zinc, and acetate of lead are all insoluble. Sulphate and muriate of strychnia are soluble, while sulphates of quinia, and of morphia, and muriate of morphia, are insoluble. Corrosive sublimate dissolves very readily, but the iodide, bromide, chloride, and ferrocyanuret of potassium, the chloride of sodium, muriate of ammonia and the iodides of mercury and potassium are all insoluble. The iodates, chlorates, nitrates, phosphates, sulphates, chromates, borates, arseniates, and alkaline hyposulphates, are insoluble, as are also nitrate of silver, sulphate of copper, and probably all the metallic oxysalts. This article thus affords a most valuable means of readily separating resin of guaiacum from jalap resin, cinchonia from quinia, and narcotine from morphia. One per cent. of Chloroform added to milk, preserved it unchanged for one month, so that it was boiled without coagulating.

The mixture of Chloroform and alcohol or ether, readily ignites. Solution of nitrate of silver causes no turbidness when added to pure Chloroform ; mixed with concentrated sulphuric acid, the latter subsides without affecting its color, or otherwise changing it ; on the other hand, Chloroform sinks to the bottom of a mixture of equal parts of sulphuric acid and water. Potassium and hydrate of potassa exert no action upon it. With an alcoholic solution of potassa it is decomposed, in the cold slowly, but when heated more rapidly, into formiate of potassa and chloride of potassium. In testing the purity of Chloroform, especial notice must be taken of its specific gravity ; if less than 1.49 it contains a mixture of *lighter fluids* (alcohol, ether, or aldehyde), and in this case, on applying a flame to the vapor, it ignites, and the volume of such a mixture sensibly diminishes when shaken with twice its bulk of pure water. If it reddens litmus paper, it contains free *hydrochloric acid*, and nitrate of silver causes in it a white precipitate of chloride of silver insoluble in water ; if free *chlorine* is present litmus paper will be bleached, and a precipitate also caused with nitrate of silver solution. If the Chloroform has an acid reaction, and nitrate of silver causes in it no precipitate, or one soluble in a quantity of water, *acetic acid* is present, owing to the transformation of aldehyd, with which it was contaminated, in the air. *Sulphuric acid* may be known by the Chloroform giving a precipitate when a solution of chloride of baryta is added to it, and by its turning blue litmus to red. To test the purity of Chloroform, Souberain advises the following: To equal parts, by weight, of distilled water and sulphuric acid (the mixture being of sp. gr. 1.38), add one drop of the Chloroform; if this be good, it will sink in the mixture, but not without. To ascertain if *alcohol* be present, Mialhe recommends to drop a little of the Chloroform into some distilled water; if any alcohol be present, the Chloroform becomes whitish, but if it be free from alcohol, it remains clear and colorless below the water.—*Am. Jour. Pharm., Vol. XXI., p.* 313. According to Dr. Gregory, the chlorinated pyrogenous oils are the most pernicious foreign matters in Chloroform, as they occasion, even when slightly inhaled, pain in the head, unpleasant nausea, etc.; to detect these, add two or three ounces of the Chloroform to an equal volume of concentrated and chemically pure sulphuric acid; if the Chloroform be pure, the mixture will not be colored, but if these oils be present the acid will be colored dark-brownish yellow, owing to the quantity of these foreign substances contained in the Chloroform. Another test is, to place a little Chloroform on the hand, it speedily volatilizes, leaving a hardly appreciable odor if pure, but if these oils be present, they may be recognized by their peculiar offensive, acrid, and penetrating odor, while the odor of the Chloroform has dissipated.

Properties and Uses.—Internally, Chloroform is a stimulant, sedative, antispasmodic, and anæsthetic. It has been used successfully in asthma, spasmodic cough, scarlatina, atonic quinsy, hysteria, lead-colic, cancer, neuralgic affections, and in intermittents. It may be administered in doses of from thirty to eighty drops in solution of gum Arabic, or in a mixture of water and yolk of egg, repeating the dose, if required, every half-hour, hour, or two hours, until it has occasioned the desired influence. When the pyrogenous oils are present, its administration is apt to produce nausea. The solution of camphor in Chloroform is an elegant form of administering that medicine.

Externally, it has been employed in several forms of disease; and has been beneficially used as a local application to gangrenous and cancerous ulcerations, dry gangrene, ulceration of the mouth and fauces, and in copious uterine secretions. It allays pain, corrects putrescent odors, and hastens the sloughing process; a fluidrachm or two of Chloroform added to a pint of water, will answer for these purposes.—*Tuson.* When a sponge moistened with it is placed in proximity with the os uteri, it has relieved painful menstruation.—*Higginson*; and has also proved serviceable when applied externally in tic-douloreux, rheumatic affections of the eye, soreness of the spinal column, and in orchitis. Thirty minims of Chloroform mixed with five drachms of lard, has been employed as an ointment in cutaneous eruptions of a papular character. When applied to the uninjured skin there is no necessity for diminishing the strength of Chloroform; a piece of lint moistened with it may be applied to the part, and, its volatilization may be retarded by covering this with several thicknesses of muslin, India-rubber cloth, etc. If the Chloroform is rendered impure by the presence of anhydrous alcohol, it is thereby rendered caustic.—*Mialhe.* Chloroform is also used by inhalation as an anæsthetic agent, and, from the small quantity required, the promptitude with which it influences the system, its rather pleasant action, its more agreeable and less persistent odor, its moderate price, and the facility with which it may be administered, it is superior to ether, and is more generally preferred. It is principally used in surgery and midwifery, as an anæsthetic, for the purpose of producing insensibility to, or relieving pain and facilitating labor. The effects usually occasioned by anæsthetic doses of Chloroform are, whizzing and pulsation in the head, a change in the apparent color of objects, pleasurable ideas and visions, loss of consciousness, incoherent talking or muttering, and sometimes loud or noisy respiration, muscular relaxation, and complete insensibility to pain, from whatever cause. A minute or two generally suffices to occasion anæsthesia, which will last for several minutes, but may be continued for an indefinite period, by carefully repeating the inhalation at certain intervals of time, as its influence is observed to be decreasing. Sometimes, from the coughing produced, or other circumstances, it may require a long time before its anæsthetic effect is induced, but which may be obviated by holding it, at first, at a little distance from the nostrils, that it may be mixed with atmospheric air, and then gradually approaching it toward them. Its anæsthetic influence is succeeded by somnolence, or a calm slumber, and, usually, there is no remembrance of incidents which happen during the anæsthesia.

Beside surgical operations, painful affections, and midwifery, Chloroform by inhalation has been found of much utility in all irritable, painful, excited, or spasmodic conditions of the nervous and muscular systems, chronic turbulent insanity, pertussis, tetanus, dysmenorrhea, etc.

The full anæsthetic effects of Chloroform are always attended with great hazard; it has been ascertained that it may be administered to an extent sufficient to produce torpor of the nerves of sensation without completely destroying consciousness, so that, in most cases, it may be unnecessary to risk the production of an entire suspension of the mental powers.

About a fluidrachm is the quantity generally used at a time for inhalation, and this should be renewed every three or four minutes until the required effect takes place. The only apparatus needed to inhale Chloroform is a handkerchief, closely, but not too tightly, rolled up, and held in the hand, having a concavity into which the chloroform is poured, and then placed near, but not immediately in contact with, the mouth and nose. A quantity of common air should always be allowed to enter the lungs with the Chloroform vapor. As soon as the requisite amount of insensibility occurs, its inspiration should be discontinued, and only carefully repeated when there is too early a restoration to consciousness. Epileptics, those laboring under disease of the heart, those predisposed to apoplexy, or cerebral determinations, and persons who have recently lost much blood, should not be placed under the anæsthetic influence of Chloroform. It should never be administered immediately after a hearty meal, as it may cause vomiting; and when the pulsations fall below sixty, the inhalation should be stopped. Excitement, which often marks the first degree of insensibility, is a mark that the handkerchief should be removed, and not kept on, as is generally practiced. Violent excitement, and the exclamation, "I am choking," should be followed by the immediate removal of the handkerchief. The patient should be in the recumbent position, the head slightly raised by a pillow, and he should be frequently asked, while he is being pinched, what is done to him; and when he begins to answer with ill humor, "you pinch him," he is on the point of losing the faculty of sensation. As soon as he answers no more, sensation is abolished, the handkerchief should be immediately removed, and the operation at once commenced, without waiting for a complete resolution of the muscles.—*M. Baudens.* Beside the previous named conditions, anæsthesia is improper in aneurism, chlorosis, phthisis, chorea, and anemia. An impure article of Chloroform will always cause pain in the head, sickness, and emesis.

As Chloroform may and has produced unfavorable as well as serious effects, the operator ought always to be provided with a bottle of strong aqua ammonia, and whenever these unpleasant symptoms arise, the patient should be made to inhale it from another handkerchief imbued with it in the same manner as named for Chloroform, and be either restored to sensibility or not, as the case may require. According to Christison, "When the effect produced by the inhalation of Chloroform is too intense, the best remedies are the horizontal posture, cold air fanned across the face, and a stream of cold water poured on the brow and head only. Ammonia may be inhaled also; but internal stimulants should not be given till the patient revives in some measure, otherwise the respiration may be further embarrassed. In urgent circumstances artificial respiration must be promptly added to these means."

To obviate the alarming effects of Chloroform, Dr. Warren has proposed a mixture containing two parts of anhydrous alcohol, and one part of pure Chloroform. This mixture is considered less dangerous than Chloroform, and more pleasant than ether. The suggestion that either alcohol or ether by their stimulating qualities overcome the prostrating effects of the Chloroform, when, in combination with it, is probably correct.

(*See Warren*, "*On the Effects of Chloroform and Chloric Ether.*") A Chloroform liniment has been made of oil of almonds two fluidounces, Chloroform two and a half fluidrachms; mix together accurately. Pieces of flannel are to be soaked with this liniment, and applied to the painful part in cases of nervous headache, neuralgia, rheumatic, hepatic, nephritic, uterine, or intestinal pains, lead-colic, etc. By adding double the quantity of oil, it may be used for vaginal injections, which may be retained by a plug of cotton, in cases of dysmenorrhea, uterine neuralgia, or other painful affections of the uterus, bladder, or rectum.

The fumes from burning the common Puff Ball, *Lycoperdon Proteus*, are said to be anæsthetic, but not equal to ether or chloroform. It appears to possess a volatile narcotic principle, which is not taken up by alcohol, water, or strong alkaline solution.

CHONDRUS CRISPUS.

Irish Moss.

Nat. Ord.—Algaceæ. *Sex. Syst.*—Cryptogamia Algæ.

Description.—Irish Moss, sometimes called *Carrageen*, has a root-disk throwing up tufts of many flat, nerveless, slender, cartilaginous *fronds*, from two to twelve inches in height, subcylindrical at the base, but immediately becoming flat, generally dilating from the base upward, until they become three or four lines wide, and then dividing repeatedly and dichotomously, each division spreading and becoming narrower than the preceding one, and taking place at shorter and shorter intervals; the summits are bifid, the segments linear, wedge-shaped, varying greatly in length, rounded or acute, straight or curved, and often twisted in such a manner as to give the curled appearance denoted in the specific name. *Fructification* roundish or roundish-oval, subhemispherical. *Capsules* imbedded in the disk of the frond, prominent on one side, and producing a concavity on the other, containing a mass of minute, roundish, red seeds. *Substance* cartilaginous, in some varieties approaching to horny, flexible and tough. *Color* a deep purple-brown, often tinged with purplish-red, and paler at the summit, becoming greenish, and at length white in decay.—*L.*

History.—This is a very common European plant found along the sea-coasts; it is also said to grow on the Atlantic shores of this country. When fresh its color is somewhat purple, but when cleansed, and dry, as met with in commerce, it is in long crispy pieces, yellowish, or dirty-white, nearly inodorous, and of a mucilaginous taste. It swells up in warm water, almost entirely dissolves in boiling water, forming a jelly when cold. It contains oxalate of lime, compounds of sulphur, chlorine and bromine, starch, and a large portion of pectin. Pereira considers the pectin to be a peculiar modification of mucilage, and has called it *Carrageenin;* its composition, when dried at 212° F., is represented by the formula $C_{12} H_{10} O_{10}$, (*Schmidt*), or according to Mulder $C_{24} H_{19} O_{19}$. Carrageenin may be known from gum by its watery solution not affording a precipitate on the addition of alcohol; from starch, by its not assuming a blue color with tincture of iodine; from animal jelly, by tincture of nut-galls causing no precipitate; and from pectin by acetate of lead not throwing down any thing, as well as by no mucic acid being formed by the action of nitric acid.—*P.*

Properties and Uses.—A decoction of Irish Moss, with water or milk, is very nutritious, and may be used as a demulcent in chronic affections of the air-passages, chronic diarrhea and dysentery, scrofula, rickets, enlarged mesenteric glands, irritation of the bladder and kidneys, etc. As a culinary article it may be employed in the preparation of jellies, white soup, blanc mange, etc. The decoction is prepared as follows: Macerate half an ounce of carrageen in cold or warm water, during ten minutes; then boil in three pints of water, or milk if stronger nourishment is desired, for a quarter of an hour. Strain through linen. Sugar, lemon-juice, tincture of orange-peel, essence of lemon, or other aromatics, as cinnamon or nutmeg, may be employed as flavoring ingredients.

CICHORIUM INTYBUS.

Succory.

Nat. Ord.—Asteraceæ. *Sex Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—*Succory*, *Chicory*, or *Wild Succory*, is a perennial plant, having a spindle-shaped, fleshy, whitish, and milky *root.* The *stem* is solid, round, furrowed, hispid, very tough, growing two or three feet high. The *radical leaves* are spreading, above a span long, numerous, runcinate, toothed, roughish; *cauline leaves*, smaller, sessile, less lobed, the uppermost cordate, acuminate, entire. *Flowers* large, one or two inches in diameter, axillary, in pairs, sessile, placed rather remote on the long rather naked branches, and of a beautiful bright-blue color. *Corollas* flat, five-toothed. *Involucre* roughish. *Anthers* and *stigma* blue.—*L.*—*W.*

History.—Succory is a native of Europe, but cultivated in this country, where it grows in grass-fields and along roadsides, bearing large, elegant blue flowers in July and August. The root is quite bitter, and imparts its virtues to water.

Properties and Uses.—Tonic, diuretic, and laxative. The decoction, used freely, is said to have proved efficacious in jaundice, engorgement of the liver, and other chronic visceral diseases, as well as in cutaneous eruptions, gout, hectic fever, etc. An ounce of the root to a pint of water forms a good decoction. The young leaves are used as a salad. The plant is extensively cultivated for its root, which is used as a substitute for coffee, or for adulterating it; it is dried, roasted and ground. J. L. Lassaigne states that an infusion of pure coffee acquires a more or less intense green color, when some drops of a solution of persulphate of iron are added to it; while an infusion of Chicory retains its brownish color, becoming more intense with a greenish tint. If Chicory be added to coffee, the infusion will give a brownish-yellow color after the precipitate produced by the iron-salt has been deposited, and which may be facilitated by adding a little weak solution of ammonia, allowing the fluid to stand in long test-tubes. Mr. Horsley has proposed the bichromate of potassa as a test; it produces no discoloration with an infusion of Chicory, but gradually changes the weakest infusion of coffee to a deep porter brown color. When the two infusions are mixed, boil the mixture with the bichromate, add a few grains of sulphate of copper, and again boil. A flocculent precipitate is formed, of a more or less deep sepia brown color, the intensity of which varies with the quantity of coffee contained.

The *Cichorium Endivia*, or *Garden Endive*, is said, by some French physicians, to be a remedy for jaundice.

CIMICIFUGA RACEMOSA. (*Macrotys Racemosa.*)

Black Cohosh.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Di-Pentagynia.

THE ROOT.

Description.—This plant, likewise variously known as *Rattleroot*, *Black Snakeroot*, *Squawroot*, etc., is a tall leafy, perennial herb, having a large, knotty root, with long slender fibers, and a simple, smooth, furrowed *stem*, from three to nine feet high. The *leaves* are alternate, ternately decompound; *leaflets* ovate-oblong, incisely serrate, opposite. The flowers are fetid, small, and in long, terminal, slender racemes. *Sepals* four or five, rounded, white; *petals* from four to six, small, not so long as the sepals. *Stamens* very numerous; *anthers* introrse, yellow. *Stigma* sessile, lateral; *pistils* oval, forming dry, dehiscent, ovate, follicular *capsules*; *seeds* numerous, small, compressed.—*W.*—*G.*

History.—This perennial herb is indigenous to this country, inhabiting rich upland woods and hill-sides, and flowering from May to August. The officinal part is the root, though, probably, the seeds will be found as active; the root should be gathered early in autumn, and dried in the shade. It includes a rough, knobby head or caudex, from four to six lines in diameter, and of various lengths, from an inch to six or more, from which are given off numerous brittle and small radicles. The external color is blackish, or brownish-black, internally pale-yellowish white; the odor is faint, earthy, and unpleasant, and the taste bitter, slightly astringent, with a degree of acridity. Boiling water takes up its properties only partially; alcohol or ether wholly. The root contains a resin to which the names *Cimicifugin* or *Macrotin* have been given; likewise fatty substance, starch, gum, black and green coloring-matters, tannic acid, gallic acid, salts of iron, lime, magnesia, and potassa.—*Tilghman.*—*Jour. Phil. Col. Pharm.*, *VI.*, *p.* 20.

Properties and Uses.—This is a very active, powerful, and useful remedy, and appears to fulfill a great number of indications. It possesses an undoubted influence over the nervous system, and has been successfully used in chorea, periodical convulsions, epilepsy, nervous excitability, asthma, pertussis, delirium tremens, and many spasmodic affections. In chorea, it has been administered in teaspoonful doses of the powdered root, to be repeated three times a day; I, however, prefer the alcoholic extract, which I have used successfully, both alone, and in conjunction with the extract of scullcap. In phthisis pulmonalis, cough, acute rheumatism, neuralgia, scrofula, phlegmasia dolens, amenorrhea, dysmenorrhea, leucorrhea, and other uterine affections, the saturated tincture is the best mode of exhibition, and which exerts a therapeutic influence not to be obtained from the cimicifugin. Its tonic and antiperiodic virtues are well marked in remittent and intermittent fevers, and I have found it very useful in other febrile and exanthematous diseases, especially among children, where there exists a strong tendency to cerebral difficulty. It uniformly lessens the force and frequency of the pulse, soothes pain, allays irritability, and lessens the disposition to cerebral irritation and congestion. In febrile diseases especially, it frequently produces diaphoresis and diuresis. In doses of one fluidrachm of the tincture, repeated every hour, it has effected thorough cures of ophthalmitis conjunctiva, without the aid of any local application. As a partus accelerator, it may be substituted for ergot; half a drachm of the powdered root may be given in warm water, every fifteen or twenty minutes, until the expulsive action of the uterus is induced, and which it seldom fails to bring on speedily and powerfully; or half a fluidrachm of a saturated tincture of the root may be given in the same manner. After labor, it will be found effectual in allaying the general excitement of the nervous system, and relieving after-pains. In large doses it produces vertigo, impaired vision, nausea, vomiting, and a reduction of the circulation, but no alarming narcotic effects. I have known three drops of the saturated tincture given every hour, for twenty hours, to produce symptoms in every way simulating those of delirium tremens. Green tea is said to counteract its narcotic influences.

Professor C. H. Cleaveland, of Cincinnati, recommends the saturated tincture of the root, as a valuable embrocation in all cases where a stimulant, tonic, anodyne, and alterative combined is required, as—in all cases of inflammation of the nerves—tic-douloreux, periodic cephalic pain, inflammation of the spine, ovarian inflammation, spasm of the broad ligaments, rheumatism, *crick in the back* or *side*, inflammation of the eyes, old ulcers, etc. If a more active preparation is desired, he adds tincture of grains of paradise in proper quantity; and if a more powerful anodyne would be useful, he adds a solution of sulphate of morphia.

Cimicifuga exerts a tonic influence over both the serous and mucous tissues of the system, and will be found a superior remedy in the majority of chronic diseases. In all cases where acidity of stomach is present, this must first be removed, or some mild alkaline preparation be administered in conjunction with the remedy, before any beneficial change will ensue. Dose of the powder, from a scruple to a drachm, three times a day; of the saturated tincture, from five to sixty drops; of the decoction, from two to four fluidounces. The saturated tincture of this article was recommended by me in acute rheumatism, in the New York Philosophical Journal, as early as in the year 1844; to be given in doses of ten drops every two hours, gradually increasing to sixty drops, or until its action on the brain is observed, which action must be kept up for several days; it almost always removes the disease permanently, especially if it is a first attack. The fluid extract of black cohosh may be used in all cases where the article is indicated: its dose is from half a fluidrachm to two fluidrachms.

Off. Prep.—Cimicifugin; Decoctum Cimicifugæ; Enema Cimicifugæ Composita; Extractum Cimicifugæ Alcoholicum; Extractum Cimicifugæ Fluidum; Tinctura Colchici Composita; Tinctura Cimicifugæ; Tinctura Cimicifugæ Composita.

CIMICIFUGIN. (*Macrotin.*)

THE RESINOID PRINCIPLE OF THE ROOT OF CIMICIFUGA RACEMOSA.

Preparation.—Cimicifugin is prepared in a manner similar to that for obtaining Podophyllin, or Leptandrin. The saturated tincture of the root is diluted with its bulk of water, the alcohol is distilled off, and the resinoid precipitates to the bottom of the vessel. Or it may be precipitated by alum, acids, etc., but is not so active when thus prepared.

Prof. E. S. Wayne, of Cincinnati, one of our most thorough chemists, has made a preparation from the tincture of the root, which appears to possess all its medicinal virtues in a concentrated form. The saturated tincture of the root is allowed to evaporate spontaneously, when there is deposited a solid mass; the remaining fluid is poured from this, the mass is dissolved in alcohol, slowly evaporated to the consistence of a fluid extract, and is then placed in thin layers on glass and allowed to dry. It has the peculiar smell and taste of the root.*

History.—It is a dark-brown substance, sometimes yellow, being lighter-colored after pulverization, of a faint, narcotic odor, and a slightly bitter, feebly nauseous taste, soluble in alcohol. This valuable and useful remedy I have used successfully in medicine since 1835, and had the honor of calling the attention of practitioners to it in 1844, and again in the Western Medical Reformer, of 1846; but it was not received into general use among practitioners until its preparation on a large scale by our indefatigable pharmaceutist, W. S. Merrell, and it is now ranked among the standard and most important remedial agents. As I have dropped the name of Macrotys in this work, and adopted the one more universally used, I have also taken the liberty of substituting the name *Cimicifugin* for that of *Macrotin*, considering it more correct, and fully as euphonious.

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* A great deal of farrago and falsehood in relation to the concentrated agents have lately been published to the profession by interested impostors, pseudo-chemists, hirelings, etc., for the purposes of deception and imposition. The statements are unworthy of any reply, and he must be truly an ignorant physician who permits himself to be misled by them. The attempts made to force manufactured articles upon the *profession* without acquainting them with the principles or mode of manufacture, are altogether worthy of nostrum-mongers and charlatans, and will be frowned down by every honorable and pure-minded individual.

Properties and Uses.—Tonic, alterative, nervine, antiperiodic, with an especial affinity for the uterus. It does not possess the narcotic properties of the root; which, however, is preserved in the alcoholic extract, or the ethereal extract. Used in intermittent fever, periodic diseases, leucorrhea, menorrhagia, dysmenorrhea, amenorrhea, sterility, rheumatism, scrofula, and prolapsus uteri not accompanied with an inflammatory condition of that organ or its ligaments. It has also been used with success in gleet, gonorrhea, dyspepsia, etc., and the tincture has been found an excellent application in chronic ophthalmia.

Cimicifugin may be advantageously combined with any of the uterine tonics and alteratives, as aletrin, caulophyllin, senecin, asclepidin, etc., in diseases of the uterus; it forms a useful combination, with dioscorein, for flatulency and to remove the tendency to bilious colic; and made into a pill with equal parts of dioscorein and aqueous extract of cramp bark, it is highly beneficial in flatulency, bilious colic, cramps of pregnant women, painful dysmenorrhea, spasmodic affections, borborygmi, and in cholera morbus to remove the cramps. As a parturient, it is inferior to the caulophyllin. Dose, from one to six grains three times a day. In the following, *Cimicifuga* and *Cimicifugin*, have been substituted for *Macrotys* and *Macrotin*.

The late Prof. T. V. Morrow says of this article: "For several months past I have used the Cimicifugin very extensively in the treatment of a numerous class of female diseases, for the successful treatment of which I had for many years previous been in the habit of depending mainly on the Cimicifuga Racemosa, either in the form of infusion, decoction, or tincture. My confidence in the value of the Cimicifuga Racemosa, I am free to confess, has been such as to induce me to use perhaps a larger quantity of this medicine, for the last sixteen years, than any practitioner in the United States, giving it a more extended range of application in the treatment of disease, and relying with more confidence on its ultimate efficiency, than any of my medical friends. My experience in the use of this article, during the period named, has been mostly confined to cases of leucorrhea, menorrhagia, prolapsus uteri, threatened miscarriage, dysmenorrhea, and barrenness, or sterility, in all of which cases I have obtained the most satisfactory results from the Cimicifuga; but deeming the Cimicifugin a more convenient form of the medicine for practical use, and believing it to contain the virtues of the article from which it is obtained, I have accordingly used it in similar cases, with results thus far which justify the conclusion that it will be found a satisfactory substitute.

"My experience in the use of the Cimicifugin has demonstrated to my mind that there is a slight difference in the modus operandi of this form of the medicine, when compared with the usual forms in which the Cimicifuga Racemosa has been used. That difference principally consists in the increased liability of the latter to produce a heavy, dull, and aching sensation in the forehead, in connection with a feeling of dizziness, while the former appears to manifest a greater tendency to produce aching, and somewhat painful sensations in the joints and limbs generally. I have usually given the Cimicifugin in the form of pills, prepared by adding a small quantity of pulverized Castile-soap, enough to make the mass properly adhesive, and forming it into pills of the ordinary size, and giving one every three hours during the day, in all the various cases above mentioned, whenever they have come under my care, since I commenced its use. In nearly all these cases, it has proved singularly beneficial, thus affording the gratifying evidence that it will soon become one of the most popular and valuable articles of the Materia Medica."

Another Professor, in speaking of Cimicifugin, remarks: "This medicine is, in its effects, essentially the same as the Cimicifuga. It is particularly useful in chronic rheumatic affections, and in female diseases. In leucorrhea and dysmenorrhea, as well as menorrhagia, it is invaluable. It should be used, in order to get its best effects, to the extent of producing its specific constitutional symptoms, *i. e.* a peculiar dizziness, fullness and dull aching of the head, and more or less aching in the joints. This effect should be produced every day (slightly) during the treatment, until the disease is removed. By this treatment, and the use of hip-baths, leucorrhea will often be cured in a week or ten days, without any other remedy."

The analogous diseases, gleets and gonorrheas, are greatly benefited, if not speedily cured by it, either alone or in combination with other appropriate remedies.

The Cimicifugin is also a most valuable medicine, especially as an adjunct of other remedies, in all pulmonary, rheumatic and dyspeptic affections, where there is a want of tone in the nervous system.

"It is also a very useful agent in the treatment of small-pox, in which it should be given during the whole course of the disease. It seems to divest it of its malignant character. I have never lost a case of small-pox where this medicine was used thoroughly from the beginning; and during the winter of 1849 and 1850, I treated from fifty to one hundred cases, some of which were of the most severe confluent kind. The dose is from one-fourth of a grain to one grain, to be given once in three or four hours until the proper symptoms of the medicine appear."

Off. Prep.—Pilulæ Leonuri Compositæ; Pilulæ Polygoni Compositæ.

CINCHONA.

Peruvian-bark.

Nat. Ord.—Rubiaceæ. *Sub-Ord.*—Cinchonaceæ (*Weddell*). *Sex. Syst.* Pentandria Monogynia.

THE BARK.

The Bark obtained from the *Cinchona Calisaya*, *C. Condaminea*, *C. Micrantha*, and other species, particularly the variety known as *Cinchona Rubra.*

History.—As a therapeutical agent of inestimable value, the Cinchona from its first introduction and use to the present day stands pre-eminent. In fact, no article of the Materia Medica has borne so high and unwavering a reputation. It is an agent for which, notwithstanding the vast additions to the list of the Materia Medica, no other substance has been discovered in nature nor in the laboratory that could fully substitute its therapeutical value.

The discovery of the medicinal properties of Cinchona is unknown. Some fabulous stories are mentioned concerning it, but we have no reliable information as to when, or how it was discovered. Some writers (Geoffroy, Ruiz, and Joseph de Jussieu) are of the opinion that the Indians were acquainted with its medicinal properties prior to the arrival of the Spaniards; but even this is doubtful, for La Condamine who visited Peru in 1738 found the natives then unacquainted with it, and J. J. Caldas, pupil of the celebrated botanist, Mutis, who traveled from 1802 for many years in the mountains of Peru in order to examine the natural history and geographical distribution of the Cinchonas, states that the Indians who inhabit those regions, and among whom fever often makes sad inroads, will not use it, believing that it heats the blood and the humors; and that the heaviest chastisements are often inflicted to compel them to employ it as a remedy; and he remarks that this prejudice is much against the fact of their ever having been acquainted with its use, as they cling with the greatest obstinacy to their inherited customs, vices, and prejudices. Ulloa, and Humboldt, also express the opinion that the Indians were unacquainted with the use of Cinchona.

The introduction of Cinchona into Europe was about the year 1640; it came to be known, it is said, from having cured the lady of the Conde de Chincon, at that time viceroy of Peru, of a fever; and who, upon her return to Spain, carried some of the bark with her. For some time after its introduction, the Jesuits, who received the bark from their brethren in Peru, alone used it, and kept to themselves the secret of its origin; and it was through their use of it, that its fame as a febrifuge so rapidly spread, and from which fact it derived the name which still clings to it, of "Jesuits' Bark." The medical profession at first opposed its use, and it is recorded that it was not employed by them, until Sturm of Antwerp, in 1659, and Bado of Genoa, in 1663, advocated its employment and wrote in praise of its virtues.

Notwithstanding the length of time that has elapsed since the discovery of the medicinal properties of Cinchona bark, its botanical history is yet but imperfectly known. A number of botanists have explored and described some of the sources of the barks of commerce, yet much remains to be accomplished, as we do not at the present day know the sources of the barks that are recognized as officinal by the Pharmacopœias both of this country and of Europe. The most recent information we have concerning them is from the labors of M. Weddell, who accompanied a scientific expedition, under the patronage of the French government, to Brazil and Peru in 1843, and who continued his researches until 1848.

Prior to him, was Condamine, who first described the Cinchonas, Jussieu, Mutis, Ruiz, Pavon, Humboldt, and Bonpland. Weddell's researches being the most recent, and adopted by Pereira as authority, I shall in the following text, give in a somewhat condensed form his manner of collecting the bark, description of the trees, and some remarks upon the classification of barks into Red, Yellow, and Pale barks, as adopted generally in works upon Materia Medica.

Geographical Range.—The Cinchona seems to be exclusively confined to the Andes, within the boundaries of Peru, Bolivia, Equador, and New Grenada, from 11° north latitude to 20° south latitude; chiefly growing at an elevation varying from twelve hundred to ten thousand feet above the level of the sea, and in a dry rocky soil. There at at least twelve or thirteen species which furnish the barks of commerce.

Manner of Collecting the Bark.—The name of *cascarilleros*, says M. Weddell, is given to the men who cut the Cinchonas in the woods; an appellation equally applying to those who are specially engaged in this commerce. The former, and of these alone I will speak here, are in general men who have been brought up to this laborious occupation from their infancy, and are accustomed by a kind of instinct to guide themselves in the midst of the forest. Without any compass but that intelligence peculiar to man in a state of nature, they guide themselves as unerringly in those labyrinths as if they were surrounded by an open horizon. But how often does it happen that those less experienced in this art lose themselves and are never more heard of!

The only period which is not suited for the collection of Cinchona bark is the rainy season, which in duration corresponds in some respects with our winter. If some persons contend that the period of the ascension of the sap is the best for stripping the trees, their precepts are certainly not practically adopted, for even during the rainy season the collection of the bark is only suspended on account of physical obstacles to its continuance.

The cutters are not generally engaged on their own account, but are mostly in the service of some merchant or small company. A confidential person is sent with them into the forests, who is called the *major domo.*

It is his duty to receive and examine the barks which are brought to him by the different parties in the forest, and to superintend the distribution of the provisions.

The first thing done by those who engage in this kind of speculation in a region previously unexplored, is to have it examined by experienced *cascarilleros*, who are called *diestros* or *practicos*. The duty of these is to penetrate the forests in different directions, and to ascertain to what points they may be profitably explored. They are expected to state whether there are any Cinchonas, and in what quantity; also to point out the direction in which the trees are to be found, and to report on the quality of specimens of the bark obtained.

This preliminary investigation is very important, and requires the possession of much sagacity, patience, and experience in those who are engaged in it. It is upon their report that the chances of success are calculated. If it be favorable, a road is immediately commenced up to the point which is to form the centre of the operations; and from this time all those parts of the forest adjacent to the road become provisionally the property of those who have formed it, and no other *cascarilleros* can work there.

On the arrival of the *major domo* with his cutters in the neighborhood of the part to be explored, he chooses a favorable site for his encampment, as near as possible to a spring or river. He constructs a hut or slight house to shelter the provisions and the produce of the cuttings; and if he anticipates having to remain for some time in the same locality, he commences the cultivation of maize and a few vegetables. Experience, indeed, has shown that an abundant supply of provisions is one of the most important conditions of success in this class of undertaking. The *cascarilleros*, during this time, are distributed through the forest, one by one, or in small parties, each carrying under a small cloak, and suspended at his back, provisions for several days, and the coverings which constitute his bed. In this way these poor beings have occasion to put in practice all their courage and patience in order that their work may prove fruitful. Obliged to have the hatchet or knife continually in his hand, to disembarrass himself of the numerous obstacles which arrest his progress, the *cascarillero* is exposed, from the nature of the circumstances by which he is surrounded, to an infinity of accidents which too often endanger his life.

The Cinchonas rarely constitute an entire forest, but form groups more or less compact, distributed in different parts of it. The Peruvians give these the name of *manchas*. In some cases, and most frequently, they grow separately. However this may be, it is in discovering them that the skill of the *cascarillero* is principally exerted. If the position be favorable, the tops of the trees first attract his notice; a slight movement peculiar to the leaves of certain species, a particular color of the foliage, the aspect produced by a great mass of inflorescence, enable him to distinguish the Cinchonas from a great distance. Under other circumstances he confines his inspection to the trunks, of which the external layer of the bark, or *enves* as it is called, presents remarkable characters. Very frequently the dry leaves which he finds on the ground are sufficient to indicate to him the vicinity of the object of his search; and if these indications have been brought there by the wind, he knows in what direction to look. An Indian, under these circumstances, is an interesting object for observation. Passing in and out through the narrow pathways of the forest, glancing through the foliage, and appearing to sniff the earth, he seems to walk like an animal pursuing its prey, and darts forth when he thinks he has discovered the object of his search, nor stops until he has arrived at the foot of the trunk which he had descried from the distance. It is not always, however, that the exertions of the *cascarillero* are productive of such favorable results. Too often he returns to the camp empty-handed, and without provisions; and not unfrequently, when he has discovered on the side of a mountain indications of the tree, he finds himself separated from it by a torrent or ravine. Entire days may then pass before he can attain the object which, during this period, he allows not to escape from his sight.

In order to strip the tree of its bark it is felled with a hatchet, being cut a little above the root, and the bark previously removed from this part, so that nothing may be lost; and as at the base the bark is thickest, and therefore most profitable, it is customary to remove the earth from around the trunk, so that the barking may be more complete. The tree seldom falls immediately when cut through, being sustained either by climbing plants or by the adjacent trees; these are fresh obstacles to be overcome by the *cascarillero*. I remember having once cut the trunk of a large Cinchona in the hope of bringing its flowers within reach, and, after having felled three adjacent trees, had the mortification to find it yet standing, being held up by the interlacing creepers.

When at length the tree is down, and the useless branches have been cut off, the peridermis is removed by striking it, either with a little wooden mallet, or even with the back of the hatchet; and the inner bark, being thus exposed, is often further cleaned by means of a brush. The bark is then divided by uniform incisions circumscribing the pieces which are to be removed, and these are separated from the trunk with a common knife or some other instrument, the point of which is carried as close as possible to the surface of the wood on introducing it into the incisions previously made; and if the position of the trunk prevents the operator from removing the whole of the bark by the first operation, it is subsequently divided so as to admit of its being turned. The dimensions and regularity of the pieces necessarily depend more or less on circumstances; in general, however, for the convenience of transport and facility of preparation, they endeavor to make them from fifteen to eighteen inches long, and four or five inches wide. The bark of the branches is separated in the same way as that of the trunk, excepting that it is not deprived of its exterior coating or peridermis.

The details in the process of drying also vary slightly in the two cases; the thinnest pieces of bark from the branches or small trunks, intended to make the quilled Cinchona, are simply exposed to the sun's rays, and of themselves take the desired form, which is that of a hollow cylinder; but the bark taken from large trunks, which is to constitute the flat Cinchona, or, as it is called, *tabla* or *plancha*, must necessarily undergo a certain degree of pressure during the process of desiccation, without which it would become misshapen, or take a cylindrical form as in the preceding case. To effect this, after first exposing the pieces of bark to the sun, they are placed one on the other in crossed squares, in a similar manner to that practiced in timber-yards in the arrangement of the planks of wood, and on the top of this pile a heavy weight is placed. This process is repeated for several days until the bark is completely dried.

The above process is that most commonly adopted in preparing the Cinchonas; but it will be easily comprehended that this must vary, in some degree, according to the locality, or the nature of the tree operated upon. In many places the bark is not pressed at all, or but imperfectly so, and it is then generally out of form or slightly curled. The peridermis is often but partially removed, or simply scraped. Finally, whether it be accidental, or whether it be done with the view of augmenting the weight, there frequently remains a certain quantity of moisture in the bark, which greatly deteriorates it. It thus appears that Cinchonas which would have presented the same characters if similarly prepared, may, according to the circumstances, vary very greatly. In any of these cases the labor of the *cascarillero* is by no means ended, even when he has finished the preparation of the bark; he has yet to carry his spoil to the camp, and, with a heavy load on his shoulders, to retrace his steps along those parts which, while unburdened, he traversed with difficulty. The labor involved in this part of the operation can hardly be conceived. I have seen more than one district where the bark has to be thus carried for fifteen or twenty days' journey to get it out of the wood from which it was obtained; and considering the amount of remuneration received, I could hardly imagine men so unfortunate as to engage in work so laborious and ill-paid.*

Something yet remains to be said with reference to the packing of the bark. It is the *major domo* who performs this duty. As the cutters bring him the bark, the produce of their labor, he submits it to a slight examination, and rejects that which is bad. It is then, if necessary, exposed to a fresh process of desiccation, and formed into bundles of nearly equal weight, which are sewn up in coarse canvas kept for that purpose. In this condition the bundles are conveyed on the backs of men, donkeys, or mules, to the depôts in the towns, where they generally receive an exterior envelop, consisting of a fresh hide, which as it dries makes a hard and compact package. In this form the packages are known by the name of *seroons*, and it is in them that the bark is exported."

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* In general, before the product reaches the coast it passes through at least three or four hands, and on each occasion its price is augmented; moreover, as carriage is very expensive, it follows that the price charged in Europe will afford no idea of its cost on the borders of the forest. At Pelechuco, for instance, 1 kilogramme (2 lbs. 3 ozs. avoirdupois) is only worth a franc and a half (fifteen pence), and for this twenty francs are now paid in Paris.

Previously to the year 1775, Loxa Bark was the only kind of Cinchona known in commerce. It was not until 1772 that Mutis discovered the valuable tree in the neighborhood of Santa Fè de Bogota, and at this period Europe began to receive Cinchonas direct from the ports of New Grenada, on the Atlantic. Some years later, the authors of *Flora Peruviana* (Ruiz and Pavon) studied the species of lower Peru, to the north of Lima, and these were also introduced into commerce. The only species, then, which, botanically speaking, still remained unknown in Europe, were those growing in the vast extent of country extending southward. Notwithstanding the efforts of De Jussieu and the botanist Thaddeus Haenke, little was added to the scientific knowledge of the Cinchonas by their travels. In the work by M. Weddell, he has made known the species observed by him in those regions during the years 1845, '46, and '47. The immense commercial demands on the Cinchonas of these parts, tending to exhaust the forests, rendered it necessary that new sources should be discovered.

At a period when the consumption of these barks was becoming more and more considerable, it was desirable that attention should be directed to those Cinchonas which will have to replace the Calisaya bark, the supplies of which latter bark are becoming less abundant, and more especially as the mode of collecting this valuable article under the control of the half savages by whom it is performed, has been done in a very ruinous and wasteful manner. To remedy the evil, at least as far as lie in its power, the government of Bolivia prohibited the cutting of the bark from the year 1851, for three years; this, together with a monopoly by the government of all the bark then cut in its territory, caused a rapid rise in the value of Calisaya bark, and forced the manufacturers of quinia to make use of other barks, in its preparation, from New Grenada, in which barks a new alkaloid has been discovered.

This one species, the Calisaya, may be exhausted, or, the supply be very much diminished. To give some idea of the consumption of this bark, and the enormous drain upon the localities from which it is obtained, the Company, who have a monopoly of it, export annually more than 850,000 pounds of it. From the observations of Weddell, this Cinchona does not spring up again in the localities from which it has been cut; the circumstances peculiar to its growth being, as it were, altered, and, a stunted growth, the variety B. Josephiana is the only representative of the majestic C. Calisaya to be found in the localities which have been destroyed by the hands of the cascarilleros. The great extent of country, however, over which the Cinchonas are spread, excludes the idea, which has been entertained, that we shall ever be deprived of this valuable drug, or, that the price of it will ever be enormously high, in consequence of the careless and destructful manner in which it is collected; but, at the same time, it would be judicious to prevent, if possible, the useless destruction of so valuable a product.*

CLASSIFICATION OF BARKS.—In most works on Materia Medica, we find the Cinchona barks classified according to their color, i. e. into the yellow, pale, and red barks; the Cinchona Calisaya, as yellow bark; the C. Condaminea, and C. Micrantha, as pale barks; and, an undetermined species, probably the C. Ovata, as red bark. This classification, M. Weddell observes, is very defective; not only does it separate the products of the same tree, but it connects those which are essentially different. Formerly, it was thought that all the grey Cinchonas were furnished by the same species, and many persons at the present time are of this opinion. But not only are they produced by many different species, but very frequently they are the young bark of the same trees which yield the yellow and red Cinchonas. A more useful, and, indeed, more natural classification would be founded, in the first instance, upon the chemical composition of the barks, it being only necessary to study their active principles, as quinia, Cinchonia, etc. But the results obtained by this method, although satisfactory in theory, would not be so in practice, on account of the unavoidable difficulties arising from such a mode of classification, and, also, from the fact now fully proved, that the same botanical species furnish barks varying greatly, according to accidental circumstances. And, he further remarks, that if a classification be absolutely needed, one which should be based upon the anatomical structure of the bark, would be found of much greater utility than either of the preceding, inasmuch as we shall find existing, even in the Cinchonas, a certain relation between their structural and chemical characters. M. Weddell gives the data upon which he bases the latter conclusion; they are, however, debatable, and as they, and the objections to them, would occupy space, that to the student and general reader, might be more profitably applied, I shall omit them. A classification of them, taking the color as a basis, has, however, been made by M. Weddell, in his work (*Hist. Naturelle des Quinquinas*, 1849), which is given below, together with the botanical species from which they are believed to be obtained.

I. GREY CINCHONA BARKS.

§I. LOXA CINCHONA BARKS. (Crown Bark *Angl.*—China-Loxa, Kron China *Germ.*)

Loxa Cinchona bark, grey compact	*Cinchona Condaminea* H. et B.
Loxa Cinchona bark, brown compact. (*Dunkele Ten China* Germ..—*China pseudo-Loxa* Bergen)	*C. scrobiculata* H. et B.
Loxa Cinchona bark, red chestnut.—Light Calisaya.	
Loxa Cinchona bark, red fibrous of the King of Spain (*Quinia estoposa* Pav. in collect. Lamb. Mus. Brit.)	
Loxa Cinchona bark, yellow fibrous	*C. macrocalyx* Pav.

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* The Dutch Government, with the view of preventing the extinction of the Calisaya bark, have attempted the cultivation of the tree in Japan, and thus far have met with some success. *See Am. Jour. Pharm.*, XXVIII., p. 325.

§ II. LIMA OR HUANUCO CINCHONA BARKS. (Silver Bark, Grey Bark *Angl.*— China-Huanuco, Graue China *Germ.*)

Lima Cinchona bark, grey brown (*Cascarilla provinciana* Peruv).	*C. micrantha* Ruiz et Pav. or *C. lanceolata* Ruiz et Pav.
Lima Cinchona bark, grey ordinary	
Lima Cinchona bark, white	? *C. purpurea* Ruiz et Pav.
Lima Cinchona bark, very rugous, resembling the Calisaya bark.—*Cascarilla negrilla* Peruv. (? *Cascarilla lagartijada* Laubert)	*C. glandulifera* Ruiz et Pav.
Cinchona bark, red of Jaen or of Loxa	?

II. RED CINCHONA BARKS.

(Red bark *Angl.* Rothe China *Germ.*)

Red Cinchona bark, becoming white in the air	?
Red Cinchona bark of Lima	*C. nitida* Ruiz et Pav.
Red Cinchona bark true, non-verrucous (*Cascarilla roja verdadera*, Laubert)	
Red Cinchona bark, officinal	
Red Cinchona bark true, verrucous	
Orange-red Cinchona bark, verrucous	?
Pale-red Cinchona bark with a white surface	
Brown Carthagena bark	
Red Carthagena bark	

III. YELLOW CINCHONA BARKS.

Yellow Cinchona bark of the King of Spain (*Cascarilla amarilla del rey.* Laubert).	*C. Calisaya* Wedd.
Calisaya Cinchona bark, or Royal Yellow bark (*Königs China* Germ.—*Yellow bark* Angl.—*China regia* Bergen)	
Orange-yellow Cinchona bark.—Cinnamon Cinchona bark (*quinquina—cannelle*), light Calisaya (*cascarilla claro-amarilla* Laub).	*C. micrantha* Ruiz et Pav.
Pitaya Cinchona bark. (*Quinquina de la Colombie ou d'Antioquia* Guib. Hist. Nat. des Drog.—*Cascarilla parecida à la Calisaya* Laubert).	*C. Condaminea* Humb. et Bonp.
Woody Carthagena bark (*Quinquina de Colombie ligneux*).	
Orange Cinchona bark of Mutis (*Spongy Carthagena bark; New Spurious Yellow bark* Pereira).	*C. lancifolia* Mutis.

HUAMALIES CINCHONA BARK. (Rusty Bark *Angl.*—China Huamalies, Braune China, *Germ.*)

Huamalies Cinchona bark, dull grey	*C. hirsuta* Ruiz et Pav.
Huamalies Cinchona bark, thin reddish	? *C. purpurea* Ruiz et Pav.
Huamalies Cinchona bark, white.	?
Huamalies Cinchona bark, ferruginous	*C. micrantha* Ruiz et Pav.
Yellow Cinchona bark of Cuenca	*C. ovalifolia* H. et B.

IV. WHITE CINCHONA BARKS.

Ash-colored Loxa Cinchona bark (*Ash bark* Angl.—*Blasse Ten-China* Germ.—*China Jaen* Bergen).	*C. ovata* Ruiz et Pav.
Grey Cinchona bark, pale ditto	
White Loxa Cinchona bark	
White fibrous Jaen Cinchona bark	
Cuzco Cinchona bark	*C. pubescens* Vahl., or *C. cordifolia* Mutis.
Arica Cinchona bark	
Pale Yellow Carthagena Cinchona bark.—(*Hard Carthagena bark* Angl.—*Quina amarilla* Mutis.—*China flava dura* Bergen).	*Ibid.*
Orange yellow Carthagena Cinchona bark (*Quinquina de Maracaïbo,—China flava fibrosa* Bergen)	
Pitayon Cinchona bark, or false Pitaya Cinchona bark	?

The following, according to M. Guibourt, are the most active barks:

1. Calisaya Cinchona bark
2. Yellow orange "
3. Pitaya "
4. Verrucous true red "
5. Non-verrucous true red Cinchona bark.
6. Red Lima "
7. Grey Lima "
8. Verrucous white Huamalies "

Botanical Description.—The botanical description of each variety of Cinchona, from facts, heretofore mentioned, is an impossibility, and the attempts to make an accurate description whereby the novice could distinguish the commercial varieties of bark, are equally impossible. I shall not attempt either, and shall confine myself to the description of only the most valuable varieties, as—the C. Calisaya, C. Condaminea, C. Micrantha and also the most recent information concerning the so-called red bark the origin of which is at present undetermined; and shall refer the reader for further information upon other varieties, sometimes met with in commerce, to Pereira's celebrated work on Materia Medica.

CINCHONA CALISAYA.—*Specific Characters* (M. H. A. Weddell.)—*Leaves* oblong or lanceolate, obovate, obtuse, attenuated at the base, rarely acute on both sides, smooth, polished or pubescent beneath, scrobiculate in the axils of the veins. *Filaments* usually shorter than one-half the length of the anthers. *Capsule* ovate, scarcely equal in length to the flowers. *Seeds* frequently fimbriate-denticulate at the margin.

a. Calisaya vera. A tree, with obtuse oblong-obovate or oblong-lanceolate leaves.

β. Josephiana. A shrub, with somewhat acute, oblong-lanceolate or ovate-lanceolate leaves.

Cinchona Calisaya, Wedd. *Ann. Sc. Nat.*, x. 6 [*Pharmaceutical Journal*, vol. ix., p. 232, for November, 1849.]

Hab.—Bolivia and Southern Peru.—(v. v.)

a Calisaya vera.—A tall tree. Trunk straight or bent, naked, not unfrequently twice the thickness of a man's body. The leafy head (*coma*) for the most part elevated above all the other forest trees.

Bark of the trunk thick. The periderm mostly thicker than in other species of the genus, easily separable from the liber, and, when separated, exposing on the surfaces of the latter, furrows or impressions resembling carvings; furnished with vertical parallel fissures, and transverse, more or less, annular scissures; whitish or also blackish. Periderm of the branches whitened or variously marbled by the thalli of lichens: and marked by rather sinuated fissures and narrower scissures. Bark of the branchlets thin, smooth, and brownish olive-colored or blackish. It grows in declivities and steep and rugged places of the mountains, at an altitude of from 1,500 to 1,800 meters, in the hottest forests of the valleys of Bolivia and Southern Peru; between 13° and 16° 30′ south latitude, and from 68° to 72° west longitude; in the Bolivian provinces of Enquisivi, Yungas, Larecaja, and Caupolican; and in the Peruvian province of Carabaya. It flowers in April and May.

The bark is commonly called indiscriminately by the Spaniards and Indians, *Cascarilla Colisaya*, *Calisaya*, or *Culisaya*.

β Josephiana.—A shrub from two to three meters high, with a slender branched trunk of from three to five centimeters thick. Branches erect. Bark adhering firmly to the wood; that of the trunk and branches schistaceo—blackish, smoothish, or furnished with different lichens and marked in an annular manner by some narrow, distant scissures; that of the branchlets reddish-brown.

Observations.—It is to this species that we are indebted for the most valuable of the barks employed in medicine; it is that met with in commerce under the name of Calisaya bark, but of which the botanical origin has, up to the present time, remained unknown. As met with in commerce, it occurs both in quilled and flat pieces. The *quilled bark* is in fragments varying from an inch or two to twenty-four inches in length, from two lines to two inches in diameter, and from half a line to seven lines in thickness. Very small quills, however, are very rare. They are generally singly quilled, though occasionally met with doubly quilled. Usually *coated*, with an outer bark or periderm; sometimes *uncoated*, or deprived of its periderm; the inner, living part of the bark, Weddell terms its *derm*, in contradistinction to its external covering, or *periderm*.

In the *coated* specimens, the periderm varies in thickness, is more or less rugous, and marked with transverse impressions, furrows, or cracks, which sometimes form complete rings around the quills. The edges are thick, everted, and raised. If the periderm is very thick, the consistence of it is corky or elastic, and the annular furrows have the appearance of deep incisions. Between these annular markings are longitudinal wrinkles or cracks. In the large quills, these furrows and cracks give the bark a very rough character, by which it may easily be distinguished from the large quills of gray bark (*Huanuco*). The periderm is nearly tasteless, having a naturally brown color, but sometimes more or less gray or silvery from the crustaceous lichens with which it is covered.

The flat or *uncoated* bark consists chiefly of liber; its taste is very bitter, and feebly astringent; its transverse fracture, externally, is resinous, internally fibrous. The color is brown externally, and it is marked with impressions corresponding to the furrows or cracks of the periderm. Internally it is finely fibrous, and of a deep cinnamon-brown color.

Flat Calisaya occurs in pieces from eight to fifteen inches in length, from one to three inches broad, and from one to five lines in thickness. It is but slightly curled, generally uncoated. It has considerable density, is perfectly uniform in texture, marked on its outer surface by longitudinal digital furrows, more or less running into one another, and separated by projecting ridges. Its external surface is of a somewhat brownish tawny-yellow, often with blackish-red patches; its internal surface is fibrous, of a yellowish-tawny color, sometimes—especially when the bark is fresh—with an orange tint, and often with an undulating grain. The transverse fracture is fibrous, the fibers being short, easily detached, and irritating the skin like the hairs of Dolichos pruriens. The longitudinal fracture is not splintery, and presents a surface covered with brilliant points, owing to the reflection of light from the denuded fibers, and is of a uniform color. The taste is very bitter; the bitterness being gradually developed by mastication, with scarcely any astringency.

The great reputation of the Calisaya bark has made it so much sought after, that it is becoming exceedingly rare, and there is no doubt that it may one day disappear almost entirely from commerce, and that we shall be obliged, ultimately, to be satisfied with one or other of the species now judged of less value. Weddell says:

"Already in the neighborhood of inhabited parts, the tree is not to be seen, excepting as a shrub, and if, perchance, a small tree has remained unperceived in the midst of a forest, no sooner does it raise its head, than it is doomed to fall by the hatchet. When for my purpose, I wished to see this species in all its vigor, I was obliged to spend long days on foot, in the forests, traversing paths that were scarcely passable, and thus experienced some of the fatigues which are the common lot of the poor *cascarilleros.*

The curious variety which I have described under the name of *Cinchona Josephiana*, in commemoration of the name, too little known, of Joseph Jussieu, is called, by the inhabitants of the country, *Ichu Cascarilla*, or *Cascarilla del Pajonal*, names which both have a similar meaning (*ichu* in the Quichua language, and *paja* in the Spanish, signifying *herb*). I have long thought that this variety should constitute a distinct species; but a more careful study made on the spot has convinced me that it is only a particular form of the type to which I have referred it. I have little doubt, also, that the districts in which it is found were once covered with forests, and that when these fell, no doubt by fire, the plant assumed this stunted form, resembling in this respect many of the Brazilian plants, which differ so greatly in size when found in the fields from that which they acquire in the forests. It is probable, therefore, that the cultivation of this Cinchona would not succeed, unless the necessary conditions were provided for promoting the growth of the plant. It must especially, be surrounded by other trees, which, growing more rapidly than itself, would afford a salutary shade during the first years of its existence. It has happened to me more than once, on the mountains of Tipoani, for instance in passing from a *pajonal*, or meadow, to a cut wood, and thence to a thick forest, that I have seen the various modifications which the *Ichu Cascarilla* assumes in form and appearance. The color and the texture of its different parts especially indicate the influence of the circumstances under which it grows. Here, the coriaceous leaves, with highly-colored nerves, and stiff petioles; there, on the contrary, the soft and velvety green leaves which distinguish the *Cinchona Calisaya*, and the flaccid petioles. Finally, when the summit of the adult plant rises above the neighboring trees, its organs reassume some of the characters of the *Ichu Cascarilla.*

The characters by which the presence of *Cinchona Calisaya* is recognized in the midst of the forests are various; and many of them require that species of instinctive knowledge which is rarely met with, excepting among those persons who have cultivated it all their lives. Every practical *cascarillero* pretends to be able to distinguish the summit of one of these trees at a distance of nearly half a mile by the movements of its leaves. This means of detection is the more easy when the tree is in flower or fruit, the color of these being characteristic. In the forest, the trunk is known at first sight by the appearance of its peridermis, which is sometimes of a grayish-white, and sometimes brown or blackish, but always marked with longitudinal and close furrows or fissures, connected by transverse fissures, a character which is not met with in any other tree in these forests, with the exception of one or two of its congeners, and to a certain degree in the *Vichullo*, with which it is sometimes confounded. This aspect, however, is frequently hidden by the mosses and other parasites which more or less cover a large portion of the trunk, and in such case the oldest *cascarillero* may be deceived. I have heard that a *cascarillero* had fixed his tent for a long time against an enormous trunk of a *Cinchona Calisaya* without discovering it, and that another more skillful than himself did not hesitate to appropriate the spoil. When the peridermis falls, the two faces of the dermis are of a yellowish color, which soon turns to brown. The odor is then that of the bark of elder, but not quite so powerful. The taste is very bitter, with scarcely any astringency, but having some degree of sharpness. The bitterness is felt on touching it with the point of the tongue.

Finally, from its external surface, especially when this has been bruised, there exudes a yellowish, gummy, resinous matter, sometimes rather milky, bitter, and astringent, to which the cutters ascribe the virtues of the Cinchona. This matter is that which fills up all the cells of the dermis, and which escapes from fissures in the young bark. But it appeared to me, contrary to the opinions of the *cascarilleros*, that it was less bitter than juice of the inner surface of the bark. It stains the clothing of a dull red, and its presence influences the color of the bark when dried. The *cascarilleros* pretend that the abundance of milk, as it is called, which is greater in the bark of *Cinchona Calisaya* than in that of other species, retards its desiccation. It is especially from the effect of pressure that this juice becomes abundantly diffused over the surface of the denuded bark; the bruised points may then be observed to assume a reddish color, which is more intense as it has been immediately and more directly exposed to the solar rays. I have even seen some *cascarilleros* irritate the whole surface of the denuded bark with a hard brush, in order that the color might be uniform.

The consistence of the bark, when it is first taken from the tree, may be compared to the flesh of a mushroom, and it may be broken in any direction with the greatest facility. The *cascarilleros* attach much importance to this character, which is the more marked as the quality is better. In the inferior barks, and especially in the false Cinchonas, where the attachment of the cortical fibers exists to a greater extent, the transverse fracture of the dermis is effected more difficultly.

The increasing scarcity of Calisaya bark induces the *cascarilleros* constantly to mix the barks of several of their Cinchonas, and this fraud is effected much more successfully than it was formerly, and without much experience, it is sometimes difficult of detection. The admixture is made especially with the barks of *Cinchona Boliviana* and *Cinchona ovata var. Rufinervis;* or, more rarely, and only on the coast, with the bark of *C. Scrobiculata;* in other words, with the barks which M. Guibourt calls, with much justice, *the light Calisayas of commerce.* With the bark of Scrobiculata it would not be likely to be long confounded, but it may readily be so with the two first; so much is this the case that in Bolivia the bark of *C. Boliviana* is also called *Calisaya bark*, a name which its properties will, at any rate, justify. *The best characters* by which to distinguish the true Calisaya from all other species, are, the shortness of the fibers which entirely cover the surface of its transverse fracture, and the facility with which these are detached, instead of remaining adherent and pliant, as is the case with the Rufinervis and Scrobiculata. Lastly, its uniform rufus color, and its not being marbled throughout its thickness with white, sufficiently distinguishes it from the bark of *C. Boliviana.*

Added to these characters, its great density (which is such that on drawing the nail across its internal surface it produces a bright mark), the depth of the furrows and their projecting edges, are generally sufficient to distinguish the flat Calisaya from all the other barks with which it may be found mixed.

As to the rolled Calisaya, it is much more difficult to distinguish it, for not only does its peridermis, in its physical characters, much resemble that of many other species, especially that of Scrobiculata and Rufinervis, but the fracture does not here present such clear characters as it does in the older barks. If even a microscope be used in the examination, the characters are very slight by which it may be recognized; such, for instance, as a slight excess of thickness in the peridermis, and a larger resinous circle, taking into the account, be it understood, the degree of bitterness which, in doubtful cases, is certainly the most sure method that can be employed to decide the question."

PSEUDO-CALISAYA BARKS.—Pereira, in his Materia Medica, designates the following list of barks as pseudo-Calisayas. They occur in quilled and flat pieces, more or less resemble the genuine C. Calisaya bark, and, as stated by him, are mixed with the genuine, in greater or less quantity, by the *cascarilleros*, and also at the places of shipment on the coast. They are:

1. C. Calisaya var. β Josephiana.
2. C. Boliviana.
3. C. Ovata var. β Rufinervis.
4. C. Micrantha.

5. C. Scrobiculata, two varieties; *α* Genuina, and *β* Delondrianæ.

6. C. Amygdalifolia.

CINCHONA CONDAMINEA.—(*C. Officinalis.*)—J. J. Caldas.—"The genuine quinia of Loxa is a tree of from ten to sixteen Spanish ells (five to eight fathoms) high. The trunk is seldom single, two or three or more commonly growing from the same root. In the first case the trunk is quite perpendicular, in the latter case it is somewhat inclined horizontally, circular, about one-half ell in diameter, and the accessory trunks from four to eight inches in diameter.

The upper surface of the bark is very variable. According to age, temperature, and locality, it varies from a *light brownish* color to *black.* If the trunk and the branches are much exposed to the sun and wind, the bark becomes black, and if the tree is closely surrounded by other trees, it assumes a brownish color, which varies to a light yellowish grey. A large quantity of lichens grow on the whole of the surface. On the epidermis, whatever its color may be, annular impressions or furrows are always perceptible, although sometimes but slightly impressed. They are the traces of the places where the stipules were situated. Immediately beneath each ring are two almost circular cicatrices, formed by the petiole after the fall of the leaves. Between the rings many other transverse furrows and cracks, varying in length, depth, and distance from each other, are perceived, mostly parallel to the rings, but never extending entirely round the trunk. All these characteristics of the surface are also found on other species of *Cinchona*, and are, therefore, insufficient by themselves to distinguish any species. On the inner smooth surface, which is formed of fine, parallel, longitudinal fibers, we perceive numerous whitish spots, some of which are shining, but most of them dull. The color of this surface is similar to that of dry cinnamon, passing rather into yellow when the bark is fresh. The edges of the fractured surface of the bark are sharp, like grass, and only here and there a small point is perceptible on the inner edge. Under a magnifier the epidermis appears attached [*gebunden*], blackish, and shining; the subjacent parenchyma, which forms a concentric ring, is thicker than the epidermis, sometimes blackish, sometimes brownish-yellow with many shining spots. Next follow the layers formed of parallel fibers, between which we observe shining points, which proceed from the gummy resinous juice diffused through the entire bark.

The branches are at the lower part terete, toward the extremities quadrangular, compressed, with two longitudinal furrows opposite the insertion of the leaves, covered with a white very short tomentum, standing crosswise, perpendicular, rarely horizontal. They divide into others, which are arranged in like manner, with a reddish bark.

The crown of the tree is oval and very leafy. The leaves are opposite, between oblong and lanceolate, quite entire, the circumference undulating, anteriorly somewhat contracted, and terminating in an obtuse point; flat, shining on both surfaces, beautifully green on the upper surface, somewhat pale on the under one; the nerve and veins rose-colored. The leaves at the ends of the branches four to eight inches long, two to four broad. When young and delicate they are covered on the under surface with a short delicate down; when full grown they are of a bright red color. The petiole is terete, above somewhat flattened, reddish, shining, one to two inches long, at the bottom slightly thickened and running down in the form of two distinct crests, by which two opposite furrows are formed which extend to the next leaves below. In the axils of the veins with the nerves the leaves have, on their under surface, a gland or porus, covered with a very short tomentum, similar to that of the coffee-leaf, or of *Cedrela odorata.* On the upper surface of the leaves we observe, at the spot where the glands are, small convexities. The stipules are opposite, between the leaves, ovate with a point, externally tomentose, internally smooth, shining, deciduous, pale green when young, at the margin rolled backward and reddish; when full grown half an inch long, 4′—5′ broad, toward the top fixed to the leaf-stalk and forming the ring on the branch described above. They are covered with a viscid and resinous juice. At the inner part of the base we perceive many small knobs which resemble the warts on the tongue and the palate of many quadrupeds. The stipules cover the leaves completely before their development, and supply thus the scales of a scaly bud. They always protect the two upper leaves, being regularly inserted higher than the leaf-stalk.

The inflorescence consists of single and terminal racemes. The manner in which this *Cinchona* flowers has been differently described by various authors, and deserves, therefore, more strict attention. The peduncle terminates the branches. It is firstly divided into three, the middle and stronger proceeds straight, and forming the axis of the whole inflorescence. The lateral branches are smaller, obliquely erect, and repeatedly tripartite, till they branch off into the smallest, which support the flowers. The axis ramifies in a similar manner. The pedicels stand always crossways on their common pedunculus. From these circumstances I consider that the term *Corymb* is not applicable, and that Willdenow's description implies the true idea of this inflorescence: *Painicula terminalis patens trichotoma.* The peduncle and pedicels are quadrangular, with obtuse angles, compressed with two furrows, reddish, and covered with a very short whitish tomentum. The floral leaves, which are on the first, second, third, and also on the fourth division of the chief peduncle, agree in consistence, form, and tomentum, with the other leaves; they are opposite stalked, and above become gradually smaller. On all the other divisions and subdivisions of the inflorescence are acute bracts, which are opposite, half embrace their axis, are tomentose, internally shining, becoming smaller upward, persistent till the fruit is perfect and then falling off, when the latter dehisces and disseminates the seed. One, sometimes two, deciduous, subulate, scaly, bractlets, very short, and of the same consistence as the bracts, are at the base of each flower. The monosepalous, superior, companulate, very small, tomentose calyx is divided into five acute straight teeth. The corolla is monopetalous and salver-shaped; the tube cylindrical, a little constricted toward the top, imperceptibly curved, with five longitudinal furrows, corresponding to the sinuses between the segments of the limb, much larger than the calyx, externally deep rose-colored, with a short white tomentum, internally of a beautiful rose color and without hairs: the limb, flat, extended, with five oblong lanceolate segments, much shorter than the tube: the segments of the same color as the tube, and covered with tomentum on the outer side; internally of the same color as the inside of the tube, and not tomentose, but at the margin woolly, ciliated. The apex of the segment more tomentose than the rest of the margin. The color of this tomentum is white. The filaments are five, and subulate; inserted below the middle of the tube. From thence they extend to the bottom of the corolla, corresponding to the furrows of the tube and to the sinuses between the segments. They are shorter than the tube. The anthers are linear, straight, somewhat divided at the bottom, hardly projecting with their points above the throat, two-celled, with yellow pollen, attached to the filament a short distance from the base. The pistil beneath the calyx, short tomentose, with an obovate ovary. The style is filiform; the two linear obtuse stigmata approaching one another. The fruit is an oblong capsule crowned by the calyx, compressed with two longitudinal furrows, two valves, and two cells. The dissepiment is formed by the union of the inner margins of the valves, by which the fruit becomes, as it were, divisable into two capsules. It dehisces longitudinally, and at the separation of the margins of the valves the seed and the seminal receptacle are expelled. The valves consist of two coats; the external one is of the consistency of the delicate bark of the smallest branches, and is marked on its convex surface with five longitudinal lines. The internal membrane is parchment-like (cartilaginous), strong and almost ligneous; its internal surface is smooth. The seeds are numerous, imbricated upward, so that the lower ends are covered, and the upper ones uncovered; they are small, elliptic, compressed, surrounded by a membranous, transparent, oblong wing, which is frequently incised toward the lower end. Seminal receptacle between oblong and linear, inserted where the margins of the valves unite and form the dissepiment. It is dotted throughout its whole length, and these dots are the cicatrices left behind by the seeds.

The following are the dimensions in Paris feet in decimal parts: The tree 6—7 toises high; the trunk 1—2 feet in diameter; the leaf 3″ 6‴ long, 1″ 6‴ broad; the leaf-stalk 8‴—10‴ long, 1‴—1½″ thick; calyx 0.5‴ high, 0.7‴ broad; tube of the corolla 4.7‴ long, 0.9‴ broad; the margin of corolla (a Lacinia) 1.4‴ long; stamina 4.9‴ long; the filament in its free parts, 2.3‴ long; the same, as far as it is fixed to the corolla, 1.0‴; anther 1.6‴ long; pistil 5.9‴ long; stigma 1.1‴ long; capsule

6.7‴ long, 2.8‴ broad; seminal receptacle 4.2‴ long; seed (*i. e.* its centre without the wing) 0.8‴ long, 0.6‴ broad; wing 1.5‴ long; 0.8‴ broad.

This species of Cinchona is the most valuable of all which have been hitherto discovered in the Andes. It is the most effective and most sought after. It grows wild in the neighborhood of the town of Loxa, in an extent of 275 Spanish square miles, and in no other parts not only of the province of Quito, but of all America. It is met with neither at all elevations nor in all temperatures of the Andes. It is found only at a barometrical pressure of between 22—23‴, and at a temperature of between 14° to 18° R., in a zone having 1321 Varas east latitude, and at an elevation of from 1898 V. east to 3220 above the level of the sea. It is found between 3° 42′ and 4° 40′ southern lat. Its eastern terminus lies in 6° 35′ westward of Quito, and the western terminus in 1° 45′ from the same meridian. The natives call it *cascarilla fina amarilla*, and never quina. It flowers very probably twice, in July and August, and in December and January. The leaves fall successively, as is the case with most equinoctial plants. By the epithet *amarilla fina* it is distinguished from *colorada fina*, which differs from the typical principal form by the color of the fresh bark, which is reddish, whereas the other, as has been stated above, is yellow. This quality, however, does not appear to be permanent, for when the amarilla is dried it assumes the color of the other sort, so that the most experienced person is unable to distinguish one from the other. There are, however, a few other distinguishing characters. The leaves of colorada fina are thicker and more obtuse; the corolla is of a more beautiful rose-red, and slightly larger. The capsule is a little thicker; the glands in the axils of the nerves are common to both species."

CINCHONA MICRANTHA.—Weddell.—*Leaves* broadly ovate, obovate, or roundish, rather obtuse, more or less attenuated at base, membranous, smooth above, very slightly pubescent beneath, pubescent or hairy on the veins and in the axils. *Teeth of the calyx* short and acuminate. *Fruit-bearing panicle* thyrse-like, somewhat compressed. *Capsule* lanceolate. *Wing of the seeds* toothletted at the margin. This species grows in the Bolivian provinces Larecaja and Caupolican; in Carabaya, and also near Chicoplaya and Playa Grande, in Peru. Its bark is called by the inhabitants of Huanuco, *Cascarilla provinciana;* in Carabaya, it is termed *Motosolo;* and by the Bolivians, *Quepo Cascarilla* or *Cascarilla verde.* It is collected in large quantities in Carabaya, and is confounded with the bark of Cinchona ovata, under the name *Cascarilla morada ordinaria.* The quilled bark constitutes part of the *Huanuco* or *gray barks* of English commerce; the flat pieces are used to adulterate Calisaya bark.—*P.*

Weddell makes two varieties of this species:

α. ROTUNDIFOLIA; *C. micrantha*, Ruiz and Pavon. *Leaves* ovate-rotund.—Peru and Bolivia.

β. OBLONGIFOLIA; *C. affinis*, Weddell. *Leaves* oblong-ovate.—Peru.

CINCHONA OVATA.—The knowledge, heretofore, concerning the source of the true red bark has been very ambiguous and doubtful, but the following article by John Elliot Howard, Esq., throws considerable light upon the subject, and is probably the correct account of it.*

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* The following barks have been recently introduced into commerce, and, in a great measure, supply the place of Calisaya bark, in furnishing the alkaloids peculiar to the Peruvian bark, as quinia, quinidin, and Cinchonia. The description is by Ezequiel Uricoechea, of Bogotá:

"The increasing commerce in the Cinchona barks of New Granada, and a desire to contribute something to the knowledge of them, are my reasons for writing these lines. Much has been lately said of the Bogotá Cinchona bark (*China Bogotensis*), in which the new base *quinidin* has been found. As the new alkaloid differs from quinia, and was thought to be much inferior to it in medicinal properties, there was a check on the commerce of the Cinchona barks coming from New Granada, all of them passing under the name of *China Bogotensis;* more recently, however, considerable quantities have been exported to England. That the barks which *now* come from that country differ from one another, I hope to show in what follows, for of the *old* Cinchona trees from New Granada, it is too well known that there were a great many species, the barks of which were then exported.

Having received by private means, and not through a mercantile house, seven specimens of bark direct from Bogotá, Professor Wiggers, of Göttingen, had the kindness to examine them; and as I have had the opportunity of comparing them with other known specimens in his possession, I entertain no doubt of the correctness of his determination.

In addition to the barks, I obtained an ounce of the sulphate of quinia made by Manuel Umana & Co., in the Tequendama manufactory, regarding a qualitative analysis of which I may be permitted a few lines.

1. *China pseudoregia.* From *Chipaque*, sixteen leagues from Bogotá. There are some seven subordinate barks that come under this name. According to Reichel's analysis it contains per cent.—quinia, 1.01, cinchonin, 0.63, quinic acid, 1.29.

2. *China flava dura.* From *Suaque*, ten leagues from Bogotá. This Cinchona contains, according to Pelletier and Caventou, the discoverers of quinia, and to whom we owe the first scientific investigations of these barks, quinate of quinia and of cinchonin.

3. *China Cartagena.* From *Chipaque.* Here we see, that in the same place there are two kinds of bark collected—this and the *pseudoregia;* and probably in the woods trees of very different species grow by each other, so that these specific names taken from localities are worse than none, for they confuse instead of clear up the subject. This Cinchona bark is but a variety of the *China flava dura.*

4. *China Bogotensis.* From *Fusagasugá*, eight leagues from Bogotá. Of the whole number of specimens that I obtained, this is the only one which has been recognized as the Bogotá bark, which has given rise to so many contradictory views with respect to the bases which it contains.

5. *China rubiginosa.* Found ten leagues from Bogotá.

6. *China rubiginosa.* From *El Acerradero*, also ten leagues distant. Having these two specimens, I am able to give the locality of this bark, until now unknown. We can therefore say with certainty, that it comes from New Granada, and that M. Von Bergen was right when he asserted that this bark was exported thence, although it can also be said that the same species has come from and is produced at Cuzco, in Peru. The chemical constitution has been but little studied; from an imperfect analysis it

"It has long been a desideratum in Quinology to ascertain the botanical origin of this article of the Pharmacopœia which is still so much esteemed, and commands so high a price in the market. I have at length succeeded in obtaining authentic specimens from the place of growth, which will, I trust, tend toward a settlement of the question, although still leaving something to be desired, and to be ascertained by future researches.

Dr. Weddell points out the native locality of this species of Cinchona in his *Voyage dans le Nord de la Bolivie*, published at Paris in 1853. Touching at the Port of Guayaquil, he says :*—

'One of the barks produced by the forests of this region is the *true red bark*, which rivals the best Bolivian bark in the quantity of alkaloids which it contains. The tree which produces this precious bark, and of which I recovered the lost traces in my previous passage by Guayaquil, grows on the western slope of the Assuay, and of Chimborazo, between Chillanes and Guaranda. These geographical data will perhaps assist in deciding the botanical species to which it ought to be ascribed.'

It is exactly from this district, and in the region in which, according to

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appears to contain: according to Franck, in 100 pounds, forty-eight to fifty ounces of cinchonin. The large quantity of cinchonin here found is improbable.

7. *China rubiginosa.* From New Granada, exact locality unknown.

Sulphate of Quinia of the Tequendama Manufactory. It is very white, porous, and crystallized in small needles, the planes of which possess a vitreous luster. By the well known test with ammonia and sulphuric ether, the solution of the salt was so complete that the very small quantity that remained between the two liquids was only extraneous matter. The ethereal solution was allowed to evaporate, and it left only a residue of amorphous quinia, with no traces of crystals, which well proves the absence of quinidin. By this test then, we have to consider the sulphate of quinia manufactured in New Granada as on a parallel with similar European preparations.

Résumé. We find from what precedes, or at least we have good reason to suppose, that the seeming contradictions which have been published about the Cinchona bark of Bogotá, and of its chemical constitution, are easily accounted for by considering the varieties of bark coming into commerce under the same name from the same district. Secondly, that the barks that are now-a-days exported from New Granada are not all *China Bogotensis*, but are so different from one another, that we must acknowledge that they come from different trees; a few of these barks, those growing in the plateau of Bogotá or its vicinity, I have noticed above. And further, that *because* the barks come from New Granada they should not be underrated, for they contain some of the best sorts. Schäuffele and Bouquet have shown, that some barks obtained by them direct from the exporter Lopez, of New Granada, are as rich in quinia and cinchonin as the *China calisaya vera*, while naturally, others are not so rich, and some are poor ones.

Finally, with regard to the composition of the impure sulphate of quinia of New Granada, it must be expected to vary, and much, according to the *different* kinds of bark employed at this or that time of manufacturing. However, the sulphate of quinia, such as given by the manufactory of Tequendama to-day is quite pure; and it is with no small degree of pleasure that I can say, that our country not only produces the source of the renowned *specific*, but the men and the mind to preserve it, and to distribute it to our fellow-creatures."

* Page 48.

Laubert,* 'red bark' was first discovered, that I have obtained a specimen tree which I now describe, and of which I received a few weeks since, contained in two chests, the following portions, viz: two pieces of the trunk, three of the large roots, five of the thickest branches, and one small box containing small boughs and leaves placed between paper. The leaves, though injured by imperfect drying, are still sufficiently characteristic of the species. The collector apologized for not sending the flowers or fruit because the time of year was not favorable. The tree was cut in September, 1855. The account sent was as follows: after enumerating the parts above described, he says:

'All from the same tree of red bark (*cascarilla roja*), cut in 2° 16′ south latitude and 16′ longitude west of the meridian of Quito, from a mountain called Chahuarpata, near the village of Cibambe, in the province of Alausi, which is one of the spots which produces the best red bark. There are not now large trees to be found, but only a little larger or less than the one sent, which is of middling size. Each piece has attached to it a paper, showing the part of the tree to which it belongs.'

The trunk of the tree at the lowest part, from which the roots have been cut away, is not more than between two and three feet in circumference, and the branches are from about fourteen to eighteen inches of similar measure. The roots are of proportionate size. The thickness of the bark on branches of four and a half inches across is not more than one-tenth of an inch. The weight of the bark is about one-twentieth that of the wood. The very large and fine red bark which we sometimes see, and which commands a price of seven or eight shillings per pound, must therefore be procured from trees of great age and size, and these no doubt fall quickly under the axe of the *cascarillero*, thus accounting for the scarcity of the finest samples. The age of the tree has also probably some influence in producing the light spongy texture of those specimens which have the highest color—the coloring matter amounting in some cases to about one-third the weight of the bark.† The bark varies much in different parts of the tree. That on the trunk, and even on the large roots, presents the familiar aspect of commercial red bark with the peculiar brick-red appearance, where the warty excrescences are rubbed and chafed. Near the roots the bark becomes thicker and more corky.

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* "It grows, as we have stated, in the mountains of Riobamba, Cuenca, and Jaen, on very elevated spots, cool at night, and well exposed to the sun, as do all other fine species."—*Laubert's Memoir, etc.*

† It must be an important question for the physician to decide, whether this large percentage of vegetable matter, of complex chemical constitution, produces a good or bad result, when received into the stomach of the patient. I am not aware that we have any reliable information as to the medicinal effect of kinovic and cincho-tannic acids. I find the heart-wood of the tree to be rich in kinovic and less so in cinchotannic acids, forming together rather more than two per cent. of the weight of the wood. The leaves contain a large quantity of chlorophyll, affording an alcoholic solution of a beautiful dark green color, rich purple by reflected light.

The small branches present the silvery epidermis which we meet with in the small quills. That on the larger branches resembles exactly stouter quills of red bark, and where the outer coat has exfoliated, the derm shows the small pock marks or indentation, which are characteristic of the best commercial quality,* to which indeed the tree evidently belongs; and as I have the pleasure of presenting specimens to the Museum of the Pharmaceutical Society, I need not further describe it in this place, except to say that the different portions of the trunk and branches exhibit the variety of coating usually seen in commercial red bark of genuine quality, thus showing that it all proceeds from one tree.

The leaves vary in size and form. The largest in my possession, a little imperfect at the apex, measured about nine inches in length by six in width. The shape of the leaves is that of *Cinchona ovata*, approaching perhaps more nearly to the variety *α vulgaris* than to the var. *γ rufinervis*, in which the latter leaf appears to be somewhat longer in proportion to its width. The red bark leaves, however, instead of being '*subcoriaceous*' (as in the *α* variety, illustrated by specimens given me by Dr. Weddell), are '*submembranaceous*,' thus confirming its connection with the variety *γ erythroderma*, the bark of which agrees very closely with the sort under consideration.

Of this variety, Dr. Weddell says:†

'No *Cinchona* (unless it be *C. condaminea*) is so susceptible of variation through soil and climate as *C. ovata*. It is particularly in the bark that these changes become manifest. * * A single individual of *C. ovata* frequently produces distinct varieties of bark on different sides of the trunk. The periderm is generally (in this species) much thinner on the eastern than on the western side. * * The variations which are to be noticed in the young bark of different individuals are still more striking, particularly in the periderm. * * I at one time thought that the 'true red bark' ought also to be attributed to *Cinchona ovata*, but, in looking at the specimens which M. Guibourt has shown me, I have been obliged to suspend my judgment. The barks on which I have founded this opinion were gathered in the valleys north of Cuzco, and as the tree which produces them presents at the same time some differences in the leaves, I have made it into a separate variety, giving it the name *erythroderma*, which recalls its most interesting character.'

This seems to have been a most felicitous designation thus conferred by anticipation by this excellent botanist, who has done so much to illustrate the history of this invaluable genus. This variety will in future be, in all probability, regarded as affording the *true red bark of commerce*, of

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[*] See *Pharm. Jour.*, *Vol. XI.*, *p.* 497. The red bark which came in the same ship, and I think from the same place, was of very good quality, and contained from three to four per cent. of alkaloids, including a fair proportion of quinia.

[†] *Histoire*, etc., p. 62.

which it is well-known there is but one sort which passes current and obtains a high price, while other samples (however *red* in appearance), which proceed from *C. micrantha*, var. *rotundifolia*,* or from *C. scrobiculata*,* or *C. pubescens*, or even from a variety of *C. lancifolia*, are not at all received as "red bark," but are regarded as "spurious," and the price is low in proportion.

I can not, therefore, coincide with M. Guibourt in the opinion which Dr. W. appears at one time to have derived from him, that commercial red bark is the produce of a variety of trees. On the other hand, I am glad to agree fully with the opinion of this able professor, as given in his *Histoire Naturelle des Drogues Simples*, that the *Quinquina rouge vrai non verruquex* (viz., that of the branches), and the *quinquina rouge verruquex* (that of the trunk and roots), constitute together the true red bark of commerce.

M. Guibourt adds (and I think his observations are very important, as determining the next question which presents itself to our view):

'I have shown before how this bark has been, *according to false indications of Mutis*, attributed to the *Cinchona oblongifolia*. This error was only discovered when Humboldt had brought into Europe the pretended "red bark" of Mutis ,or the bark of *Cinchona oblongifolia*. The error was first discovered in Germany by Schrader and De Bergen, who found that the *red bark of Mutis*, or the bark of *C. oblongifolia*, was that which bore in Europe the name of *Quinquina nova*. To the irresistible proofs which these two authors have given I will add—1. That the red bark of Mutis deposited by Humboldt in the Museum of Natural History at Paris, is *nothing else but Quinquina nova*. 2d. That three samples examined by Vauquelin under the following denominations: No. 2, *Quinquina de Santa Fé;* No. 10, *Cinchona magnifolia;* No. 16, *Quinquina rouge de Santa Fé;* were *Quinquina nova*, shown to be such by the characters of the bark and by the chemical qualities of the macerating liquors. Thus nothing is better proved than this fact, that the *Cinchona oblongifolia* or *magnifolia* produces the *Quinquina nova* and not the *true red bark*.'

It must therefore be fully admitted that *Cinchona Coblongifolia* (*ascarilla magnifolia*.—Weddell) is *not* the source of commercial red bark, but only of the worthless *Quina nova*, a bark which has been sold at an extremely low price to the tanners, though I never heard that they profited by the bargain. However frequently this name may be repeated by the old Pharmacopœias, no druggist who regards his character would venture to sell the bark of *inchona Coblongifolia* of Mutis as having any value in medicine.

It is true that Messrs. Delondre and Bouchardat, in their recently published *Quinologie*, have given forth as their opinion that the "red bark of Mutis" was none other than what is usually considered to be the red variety of the *lancifolia bark* of New Granada. It is not improbable that these might enter into the composition of the immense cuttings of coarse red barks ('cortezones roxos'), which, it appears,* that Mutis sent over to Spain, since it was doubtless then, as now, too frequently the practice to cut any tree that resembled that which they were seeking,† and to intermingle the products; but this does not disprove the testimony, which appears to me conclusive, that the *Cinchona oblongifolia* of Mutis (furnishing the *Quina nova*, which I have described in a previous volume‡) was that on which this botanist relied to compete with the genuine red bark of Quito. He was determined that New Granada should supply *its red bark*, and since the country did not furnish the article, he fixed upon a sort which externally bore some resemblance, and made a powder of a similar color, and to which it is but just to Mutis to say, that he only ascribes an § '*indirectly* febrifugal' power.

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* These two sorts illustrated by samples gathered by Dr. Weddell.

I think that I have thus sufficiently shown that the old venerable name of *Cinchona oblongifolia* may be safely disposed of. In the next place, in order to give some greater certainty in this attempted identifi-

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* See *Pharm. Journal*, vol. xii., page 340.

† "Se substituen en su logar las cortezas del arbol que se encontran mas parecido." —*Suplemento de la Quinologia*, page 36.

‡ See *Pharm. Journal*, vol. xii., page 340.

§ I extract from the *Suplemento de la Quinologia*, page 109, the following information from the pen of Dr. Mutis, which is stated to be the only *botanical* description of the barks of New Grenada which he published. As the authority of Dr. Mutis has been very prevalent, it is well to give the quotation in its original language and form, that it may lose nothing of its importance by translation: "The following is the statement of the number and properties of the officinal barks inserted by Dr. Mutis in the periodicals of Santa Fé:

En la Botanica—*Cinchona.*

Lancifolia	Oblongifolia	Cordifolia	Ovalifolia

Quina.

Hoja de lanza	Hoja oblonga	Hoja de corazon	Hoja oval

En el Comercio.

Naranjada primitiva	Roxa sucedanea	Amarilla substituida	Blanca forasters.

En la Medicina: *Amargo.*

Aromatico	Austero	Paro	Acerbo
Balsamica	Astringente	Acibarada	Xabonosa
Antipyrectica	Antiseptica	Cathartica	Rhyptica
Antidoto	Polycresta	Ephratica	Prophilactica
Nervina	Muscular	Humoral	Visceral
Febrifuga		*Indirectamente febrifugas.*"	

This enumeration of qualities for the bark of the oblongifolia clearly points to the *Quina nova*, as his recognized *red bark.*

The bark of the lancifolia is alone admitted to be directly a febrifuge.

That of the ovalifolia can only act through the kinovic acid it contains. Is this inert, or has it *any* action on the human system?

cation with the new term, I must mention that I wrote to Dr. Weddell, and also transmitted to him some of the leaves. He says (under date August 2nd), in reference to 'Quinology:' 'You have evidently solved one of its most interesting desiderata,' and (under date August 12th, having received the leaves), he adds, 'the leaves I find in a better state of preservation than I might have expected from your account. *They undoubtedly appear to correspond exactly to what you infer as to their botanical origin.*'

I have thus given all that it is in my power to afford at present for the direct elucidation of this question. It remains that I add one or two indirect but confirmatory notices. First, as to the *Cinchona colorada de Huaranda* proceeding from a species called by Pavon *Cinchona succirubra*, and which I have described in vol. xi., p. 497 of Jour. Pharm. as commercial red bark. In the course of last year I found, at Kew, Ruiz and Pavon's, a botanical specimen of this, and it proves to be also a *Cinchona ovata*, akin in the sub-membranaceous character of the leaves to those which I have since received direct.

In reference to this specimen, Dr. Weddell remarks in the *Bulletin de la Societé Botanique de France*, tome ii., p. 438:

'It seems to me now demonstrated that the tree to which I applied in my *Histoire des Quinquinas* the name which I have mentioned, is really that which produces the officinal red bark. My hypothesis is confirmed by an interesting discovery made quite recently by Mr. Howard, in the herbarium of Sir W. Hooker. It is that of a flowering specimen of *Cinchona*, bearing in the handwriting of Pavon the provincial name which is now generally known to be that of 'red bark,' *Cascarilla colorada de Huaranda.*

'Mr. Howard having obligingly communicated to me the figure which he had caused to be drawn of this specimen, I had no difficulty in seeing in it the image of my *C. erythroderma.* It is true that the differences * which I mentioned between the bark of my tree and that which is commonly met with in commerce exist still as before, but I have found intermediate forms which so perfectly connect these two types, that there no longer exists in my mind any doubt concerning their identity.

'There may be a doubt, on the contrary, as to the rank which should be attributed to the plant which produces them. Should it still be attached to *Cinchona ovata* as a variety, or should it be raised to the rank of a species? It is a point which can scarcely be finally decided till we know its fruits. Whatever it may be, the discovery made by our colleague Mr. Howard, of a flowering branch of the *Q. de Huaranda*, has certainly made a great step toward the solution of the problem, and has appeared to me worthy the attention of the Society.'

I may add, in reference to the piece of the bark of *C. erythroderma* (*C.*

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* "The texture of my bark is more woody than that of the typical red bark."

ovato var. γ *erethroderma*) given me by Dr. Weddell, that it agrees in minute particulars with that of commercial red bark. The color of the denuded derm, the indentations upon this, and the impression of the cross crack, forming a ring at distant intervals, also the character of the periderm,—all these correspond; but the color is not fully equal to the *finest* red bark, and it is perhaps rather more dense and woody; but even the bark of the branch and trunk of the same tree vary in these particulars.

The Huaranda bark in the British Museum, which both M. Guibourt and myself regard as genuine 'red bark,' has also peculiarities such as might mark a tree grown in less favorable soil. The leaves and small branches of my red bark tree give the impression of luxuriant vegetation. That of Pavon's specimen, on the contrary, tells of rather stunted growth. But such variations must be expected in a tree growing in localities so distant from one another.

The last particular which appears to me confirmatory of the correctness of this botanical derivation, is the very close analogy which exists between the 'red bark' and that which is called in commerce '*Carabaya bark*,' and which, according to Dr. Weddell, also proceeds from a variety of *C. ovata.* This struck me long ago, and would occur to any person who will take the trouble to compare the two sorts; but it is not a matter susceptible of demonstration, and I will not dwell upon it.

It is to be hoped that the remaining links of this chain of investigation will shortly be added, through our being put into possession of the flowers and fruit, as well as a further supply of the leaves of this interesting tree; and that these will afford materials for completely determining whether it coincides with Dr. Weddell's *Cinchona ovata*, var. γ *erythroderma;* and whether, if such be the case, that plant ought to be raised to the rank of a species."—*Jno. E. Howard*, *Esq.*

Chemical History.—Pelletier and Caventou have found in Cinchona Bark (Loxa), Kinate of Cinchonia, Kinate of lime, green fatty matter, red Cinchonic, soluble red coloring matter (tannin), yellow coloring matter, gum, starch, and lignin. Bucholz found Cinchonia 0.36, Kinic Acid 1.17, Kinate of lime 1.30, hard resin (red Cinchonic) 9.97, bitter soft resin 1.56, fatty matter with chlorophylle 0.78, tannin with some chloride of calcium? 5.80, gum 4.43, starch a trace, lignin 74.43.

M. Souberain makes the following remarks upon the constituent principles of Cinchona bark, and the methods of obtaining them;

"We distinguish three principal species of officinal bark, viz:

Pale Bark, attributed to Cinchona Condaminea.

Yellow Bark, attributed to Cinchona Cordifolia, or Micranthea.

Red Bark, attributed to Cinchona Oblongifolia, or Ovata.

The several varieties of Cinchona bark are justly celebrated for their febrifuge properties, which reside in the two organic alkalies, of which we have treated in the preceding lectures.

According to MM. Pelletier and Caventou, the pale, yellow and red bark contain—

Kinate of Quinia,
Kinate of Cinchonia,
Soluble Cinchona red,
Insoluble Cinchona red,
Yellow coloring matter,
Grassgreen, coloring matter,
Kinate of Lime,
Starch,
Gum,
Lignose.

In the pale bark the relative amount of the Cinchonia is much more abundant than that of the quinia. In the yellow bark the relative proportion of the latter considerably exceeds that of the former. Adding the respective amount of the two alkalies together, the yellow bark is twice as rich in vegeto-alkali as the pale bark. In the red bark the relative proportions of the two alkalies are more evenly balanced, with a slight excess, perhaps, in favor of the quinia. The red bark is rarely as rich in vegeto-alkali as the yellow variety. To this I have to add, that MM. Henry and Plisson have found that a considerable proportion of the two alkalies is combined with the Cinchona red.

KINATES OF QUINIA AND CINCHONIA.—These two salts have been extracted from bark by MM. Henry and Plisson; they have an exceedingly bitter taste, resembling that of the bark. They are very readily soluble in water, but insoluble in alcohol of 36°; in more highly dilute alcohol they dissolve readily. Alkalies decompose them, and precipitate the quinia and Cinchonia. To obtain the Kinates of quinia and Cinchonia in the crystalline state, a solution of them is to be evaporated to dryness, and the residuary salt moistened with distilled water, whereupon it will gradually change to a mamellonated mass formed of brilliant crystals.

SOLUBLE CINCHONA RED, *or Cincho-Tannic Acid.*—The soluble Cinchona red of MM. Pelletier and Caventou is a mixture of pure tannin and tannin which has suffered some alteration, but retains still its solubility in water. Berzelius has extracted from the soluble Cinchona red a colorless tannin, which is exceedingly remarkable for the facility with which it suffers alteration, and is converted into the insoluble red, more particularly under the influence of alkalies. The compounds which this tannin forms with acids are more soluble than those formed by the tannin of gall-nuts.

The soluble Cinchona red has all the properties of tannin; it precipitates iron solutions green (the red extracted from the pale bark, however, precipitates these solutions brown).

The soluble Cinchona red precipitates gelatine and tartar emetic. With starch it forms a compound insoluble in the cold, soluble above 122° F.

The Cinchona red abounds in the officinal species of bark. It has been found also (with some slight modification in its characteristic properties), by MM. Pelletier and Caventou, in the Cinchona of Carthagena (Pertlandia Hexandra), and in the Cinchona Nova; by M. Kuhlmann in another species of bark; and by M. Henry in the bark of Condaminea Tinctoria.

Many other species of bark, most of them as yet very imperfectly known, but belonging nearly all of them to the family of the Cinchoneæ, are used in medicine, or popularly as bitter, tonic, or astringent agents; such are, for instance, the bark of Remigia Furruginea (Brazil), of Cinchona Excelsa (India), of Exostema Caraibæa, of Antirrhœa Verticillata (Island of Bourbon), of Mussinda Stadtmanni, or Bela-Ayé (Mauritius).

The Cinchona Lactifera of Peru, the bark of which yields a red juice, called Cinchona Lake, and the African Kino, which exudes from the Uncaria Gambir, are both rich in tannin, and present the greatest analogy with the preceding substances.

The bark of Exostema Floribunda also resembles in most points the above enumerated species, but it differs from them by its emetic properties.

Insoluble Cinchona Red.—The insoluble Cinchona red is inodorous and insipid; it has a reddish-brown color; it is almost insoluble in water and in ether, but dissolves very readily in alcohol.

The presence of acids promotes its solution in water to a very considerable degree. The aqueous solution obtained in the presence and by the influence of acids, does not precipitate gelatine, but it precipitates tartar emetic. Alkalies dissolve it readily. The insoluble Cinchona red, precipitated from its alkaline solution by an acid, is found to have acquired the faculty of precipitating gelatine.

Cinchona red appears to be a product of the alteration of tannin. M. Braconnot has found in the barks of other trees a matter quite analogous to the Cinchona red, and to which he has given the name Corticin.

Combination of the Cinchona Red with Quinia and Cinchonia.—The combination of the insoluble Cinchona red with the vegeto-alkalies in the bark has been demonstrated by MM. Henry and Plisson. This combination altogether resembles in appearance the insoluble Cinchona red; it has a slightly bitter taste, which becomes only slowly developed on the tongue. It is sparingly soluble in cold, somewhat more readily in boiling water; the solution in boiling water becomes turbid on cooling.

Alcohol dissolves it readily. Acid liquors dissolve it with the aid of heat. The alkalies separate the quinia from it, and remain in combination with the Cinchona red.

According to MM. Henry and Plisson's researches, it appears highly probable that there exists in bark, beside the preceding, another compound formed by the combination of the soluble Cinchona red with the organic alkaline bases.

The fatty matter, the kinate of lime, and the coloring matter which exist in bark, are of no importance in a medical point of view.

Quinia and Cinchonia.—Quinia and Cinchonia (quinine and Cinchonin), are the vegeto-alkalies which are contained in the several species of bark, and to the presence of which the latter owe their medicinal properties. These two alkaloids have been found in the three officinal species of bark, viz., the pale, the yellow, and the red.

The presence of quinia has been detected since by M. Kuhlmann in a different species of bark, of which the origin remains as yet unknown. M. Coxe found both quinia and Cinchonia in the Virginian bark (from Pinkneya Pubens). MM. Pelletier and Caventou state that they have found quinia in combination with Cinchonia in Carthagena bark (Pertlandia Hexandra), associated, however, beside, with some coloring matter, which renders its extraction a task of greater difficulty. Gruner has since found in the Carthagena bark a different alkali, which crystallizes in fine needles, and is much less soluble in ether than quinia; with sulphuric acid this alkali forms a salt which crystallizes in quadrangular prisms, and tastes like aloes. The saturating capacity of this alkali is greater than that of either quinia or Cinchonia.

MM. Pelletier and Corriol have also found in the Cusco or Arica bark a variety of the Carthagena bark, a base which differs from quinia and Cinchonia, and to which they have given the name of *Aricina*. The distinctive characteristics of Aricina are that the saturated and boiling aqueous solution of its sulphate assumes upon cooling the state of a tremulous jelly, which upon desiccation acquires a horny appearance. The alcoholic solution of sulphate of aricina, on the contrary, crystallizes in silky needles. The formula of aricina is $C_{20} H_{12} N O_3$. The subject, however, requires re-examination.

According to Manzini, the pale bark furnished by Cinchona ovata contains a peculiar basis, to which Manzini has given the name of Cinchovatine. This alkali appears to be identical with Mill's Blanquinia.

According to Peretti, the Cinchona Pitoxa contains a peculiar alkali, to which that chemist has given the name of Pitoxin; this alkali in the isolated state has no bitter taste, which it would seem to acquire only upon entering into combination with acids.

The Cinchona Nova contains a peculiar acid (Kinovic), of which the properties are so analogous to those of salsaparin that Buchner and Winckler were thereby led to confound it with the latter principle. Schnedermann has since demonstrated that the Kinovic acid and salsaparin are perfectly distinct principles. The yellow bark contains equally Kinovic acid.

Quinia or Crude Quinia.—Treat the bark with hydrochloric acid, lime, and alcohol in the same way as you would do if you intended to prepare sulphate of quinia; but, instead of acidulating the alcoholic liquor, distill it off at once. The residuary product consists of a plastic mass of firm consistence; this mass is a mixture of quinia, Cinchonia, fatty matter and coloring matters. It is technically termed 'crude quinia.' It has been used successfully as a febrifuge by Dr. Trousseau; it does not purge, like sulphate of quinia, and proves efficacious in smaller doses than the latter preparation. It has, moreover, this great advantage over the sulphate, that it is not very perceptibly bitter, which makes patients, particularly children, take it with less reluctance than they would the intensely bitter sulphate.

One kilogramme of good Calisaya bark yields about 32 grammes of crude quinia."

Quinia or Quinine.—" Quinia is an energetic alkaloid. It presents itself usually in the form of a resinous mass; but it may be obtained also in six-sided prisms. The formula of quinia is, $C_{40}\ H_{24}\ N_2\ O_2$. The equivalent number of this alkaloid is 412. In the state of hydration it contains 6 equivalents of water$=$14.1 per cent., which it loses upon fusion.

Quinia is white, inodorous, and has a very bitter taste; it fuses readily. It is only very sparingly soluble in boiling water, and, according to Magonty, still less soluble in cold water. In water at 140° F. it loses its hydration water. It is readily soluble in alcohol; hot alcohol dissolves a larger proportion of it than cold alcohol. It dissolves also tolerably wel in ether.

It forms with acids readily crystallizable salts, of nacreous aspect. They have all of them an exceedingly bitter taste. Most of them are soluble in water, alcohol, and ether. The mineral acids precipitate the quinia from the solutions of its salts. Ammonia decomposes the quinia salts only partially in the cold, while, on the other hand, quinia decomposes the ammoniacal salts upon ebullition. Gall-nuts precipitate the solutions of quinia salts.

Quinia is obtained usually by precipitating the solution of any of its salts with ammonia, collecting and drying the precipitated quinia. To obtain it in the crystalline state, M. Pelletier recommends to dissolve the resinous mass in alcohol of 90 Cent., and to leave the solution to spontaneous evaporation in a dry place. M. Henry proposes to dissolve the crude quinia in alcohol of 80 Cent., to add water to the solution until the liquid commences to turn milky, and to leave it then in the open air; in a few days the portions which had precipitated at first in the form of a fluid resin will be found converted into radiated crystals. M. Magonty advises to let the quinia crystallize from water; Liebig conducts the operation in a hot ammoniacal solution. Pereira states that a solution of quinia in alcohol or acidulated water, possesses the power of left-handed rotatory polarization, which decreases at a temperature above 72° F. Laurent gives the formula of quinia, $C_{38}\ H_{22}\ N_2\ O_4$; its equivalent weight is 370, and its symbol $Q\frac{+}{n}$.

Cinchonia or Cinchonin.—Cinchonia crystallizes readily in anhydrous quadrilateral prisms bounded by oblique facets. The formula of Cinchonia is $C_{40}H_{24}N_2O_2$; its equivalent number is 401.

Cinchonia is colorless and inodorous; it has a bitter taste. It fuses only when on the point of decomposition. It requires 2.500 times its own weight of cold water for solution, but is a little more readily soluble in alcohol, though somewhat less so than quinia. Hot alcohol dissolves a larger proportion of it than cold alcohol. In cold ether it dissolves to a very trifling extent only. It combines readily with acids. The salts of Cinchonia are bitter; they possess all the characteristic properties attributed to quinia salts. Cinchonia is obtained by precipitating its salts with ammonia; it crystallizes readily from alcohol.

The salts of Cinchonia bear, as already stated, very considerable analogy to those of quinia; yet they may be distinguished and separated from the latter, as the alkaline bicarbonates precipitate Cinchonia in presence of tartaric acid, while they fail to precipitate quinia under the same circumstances."

Pereira states that an alcoholic, or acidulated aqueous solution of Cinchonia possesses the property of right-handed rotatory polarization. Laurent gives the formula of Cinchonia $C_{38} H_{22} N_2 O_2$; its equivalent weight is 294, and its symbol Ct.

Cinchonia may be obtained by exhausting 125 parts of powdered Pale Bark, by three successive boilings with $2\frac{2}{3}$ parts of Muriatic Acid, and 500 parts of water, each time (so that 8 parts of acid and 1500 of water will be employed in the three boilings). Add the decoctions together, and then add $12\frac{1}{2}$ parts of Quicklime diffused in water, and when precipitation is completed, wash and dry the precipitate. Dissolve this in boiling alcohol, filter the solution while hot, distill in a water-bath, evaporate to dryness, digest in cold alcohol, and then dissolve the residue in boiling alcohol, with the addition of some animal charcoal; again filter while hot, and allow the Cinchonia to crystallize spontaneously on the cooling of the liquid.—*Par. Cod.*

Cinchonia differs from quinia by containing one equivalent less of oxygen, and there is no doubt but that ultimately chemistry will be able to convert one into the other; both quinia and Cinchonia yield quinolin.

The sulphate, acetate, muriate, etc., of Cinchonia, are made by dissolving Cinchonia in the required diluted acid, filtering, evaporating, and crystallizing. Cinchonia may also be made from the mother-waters, after the sulphate of quinia has been prepared; the process is to considerably dilute the mother-waters with water, and then add ammonia; the precipitate thus formed is collected on a filter, washed, dried, and proceeded with in the same manner as named in the preceding process of the Parisian Codex.

In addition to the above, we have the following by Robert Schwartz:

"Yellow bark (Königs-Chinarinde), which is said to be obtained from *Cinchona Lancifolia*, Mutis*, contains two bases, viz., Cinchonia and quinia, and three acids, kinic, cincho-tannic, and kinovic acids. It owes its peculiar reddish-yellow color to red cinchonic, a product of the decomposition of the cincho-tannic acid. Cinchonia and quinia, as well as kinic acid, have often been analysed, but nothing is at present known respecting the composition of cincho-tannic acid and red cinchonic.

When the bruised bark is boiled with water, the above mentioned substances may be detected in the watery extract. By repeatedly boiling with water, the kinic and cincho-tannic acids can be completely removed from the bark, but of the red cinchonic and of the kinovic acid, the greater proportion remains undissolved in it.

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* This is a mistake; yellow bark is the product of *Cinchona Calisaya* (Weddell).—Ed. *Pharm. Jour.*

When the bark, after being exhausted with water, is boiled with diluted milk of lime, it yields all the kinovic acid contained in it, but retains the red cinchonic. When, however, the bark previously exhausted by water is treated with spirit of wine mixed with muriatic acid, the whole of the kinovic acid is dissolved, while the red Cinchonic, liberated from its combinations by the muriatic acid, dissolves in the spirit of wine, which acquires thereby a deep red color.

Kinovic acid is contained only in a small proportion in the aqueous decoction of the bark, the greater portion being retained by the latter, which shows that the greater portion at least of the kinovic acid is contained in the bark in a free state, as it is almost entirely insoluble in water. By boiling the bark, deprived of all soluble substances, by diluted milk of lime, and filtering the decoction, a yellowish liquid is obtained, which, upon the addition of muriatic acid, lets fall an abundant precipitate of kinovic acid in the form of gelatinous flakes. In this way, a quantity of kinovic acid is obtained from the genuine Cinchona barks, which is as large as that obtained by the same method from the bark of *Cinchona Nova.*

In order to obtain the kinovic acid in a pure state, its calcareous salt, dissolved in water, is treated with animal charcoal, and the decolorized filtered liquid decomposed by muriatic acid. The gelatinous precipitate is treated with water as long as wash-water is rendered cloudy by a solution of nitrate of silver. The acid dried at 212° F., was analyzed, and yielded:

Carbon	68.90	68.80	12 = 72	68.57
Hydrogen	8.85	8.87	9 = 9	8.57
Oxygen	22.25	22.33	3 = 24	22.86
	100.00	100.00	105	100.00

All the properties of this substance, and also its composition, sufficiently prove the identity of this bitter matter with kinovic acid or the so-called kinova bitter, which exists ready formed in the bark, and can be artificially obtained from caincic acid (from the bark of the root of *chiococca racemosa*). The statements of Winckler with regard to the presence of kinovic acid in the genuine Cinchona barks are thus corroborated.

Cincho-tannic Acid.—Berzelius was the first who tried to obtain this acid in a pure state. The author has repeated these experiments, and found it advisable not to employ magnesia; the properties of the acid he found to be exactly the same as mentioned by Berzelius. The greatest difficulty in examining this acid, is offered by its tendency to absorb oxygen, so that it is scarcely possible to obtain an acid which has not absorbed a certain quantity of this element.

There exists hardly any substance which so readily combines with the oxygen of the air, as the tannic acid of Cinchona barks. This tendency is possessed in a still higher degree by the compounds of tannic acid with alkalies and alkaline earths, in a moist state, so that the alkaline cinchotannates might be employed for eudiometrical experiments, like pyrogallic acid. The cincho-tannic acid is contained in the bark in small quantities only; the author was obliged to employ forty-eight pounds of the bark to obtain a quantity of acid sufficient for his experiments.

The bruised bark was boiled with water, the decoction strained through linen, and mixed with a small quantity of magnesia, which took up some of the red Cinchonic and became brownish-red. The filtered liquid, treated with acetate of lead, yielded an abundant brownish-red precipitate, which was decomposed under water by sulphureted hydrogen. From the liquid filtered from the sulphuret of lead, tribasic acetate of lead threw down a brownish-red substance, which was partially soluble in acetic acid. By this method kinovic acid and a small quantity of red Cinchonic remain behind with the sulphuret of lead. The greater portion of the red Cinchonic, combined with a small quantity of oxide of lead, remains undissolved by the acetic acid. The acetic solution, if treated with ammonia, yields a beautiful light-yellow precipitate, which was washed with water and decomposed by a current of sulphureted hydrogen. The liquid, filtered from the sulphuret of lead, which is now perfectly free from gum, was deprived of sulphureted hydrogen by a small quantity of an alcoholic solution of sugar of lead, and filtered to get rid of sulphuret of lead.

By a further addition of an alcoholic solution of sugar of lead, a light-yellow precipitate is formed, which was separated by filtration, treated with alcohol, and placed in a vacuum over sulphuric acid. In order to prevent oxidization by some atmospheric air, which might possibly have remained behind, a paste-like mixture of protosulphate of iron and hydrate of potash was placed into the receiver. The analysis of this salt showed:

Carbon	55.70	28 = 168	55.81
Hydrogen	4.60	13 = 13	4.31
Oxygen.........	39.70	15 = 120	39.88
	100.00	301	100.00

The formula for this salt of lead is pretty nearly $C_{28}\,H_{13}\,O_{15}+3\,Pb\,O$, which may be considered as composed of $(C_{14}\,H_6\,O_7,\ 2\,Pb\,O)+(C_{14}\,H_6\,O_7,\ Pb\,O\,HO)$.

Supposing the oxide of lead in this salt to be replaced by equivalent quantities of water, the formula of the hydrate of the cincho-tannic acid would be $C_{14}\,H_6\,O_7+2\,HO=C_{14}\,H_3\,O_9$.

In order to obtain the hydrate of the cincho-tannic acid, pure cinchotannate of lead is decomposed under water by sulphureted hydrogen. The liquid filtered from the sulphuret of lead was allowed to evaporate over sulphuric acid, near a moistened mixture of protosulphate of iron and hydrate of potash, after which an inflated, brittle, yellow, strongly hygroscopic substance remained behind, which became electric on friction, and had an astringent acidulous taste. As will be seen from analysis, the acid had imbibed a certain quantity of oxygen during the short time it was in contact with the air, while the sulphuric acid in the receiver was being renewed, while another portion of it remained in an unaltered condition:

Carbon.........	44.75	42 = 252	44.84
Hydrogen......	5.49	30 = 30	5.33
Oxygen	49.76	35 = 280	49.83
	100.00	862	100.00

The formula $C_{42} H_{30} O_{35}$ can be reduced to $2 (C_{14} H_{10} O_{12}) + C_{14} H_{10} O_{11}$. Two-thirds of the tannic acid have accordingly imbibed oxygen, while one-third has remained unaltered. The formula $C_{14} H_{10} O_{11}$ is $= C_{14} H_6 O_7 + 2\ HO + 2$ aq. These last two equivalents of water, which could not be removed from the hydrate of the cincho-tannic acid in the vacuum, were tried to be expelled by heating the acid at 212° Fah., in a current of carbonic acid gas. The deep red color which the substance assumed, showed that decomposition had taken place, which was further proved by the fact, that this acid, when brought into contact with water, was but partially soluble, and remained behind in the shape of a reddish-brown resinous mass. If an aqueous solution of cincho-tannic acid be mixed with sulphuric acid, a precipitate appears, as was observed by Berzelius. If a concentrated aqueous solution of the acid be mixed with a small quantity of muriatic acid, and heated to the boiling point, the tannic acid is completely decomposed, and beautiful red flakes are formed, which dissolve in alkaline liquids with a leek-green color.

Subjected to dry distillation the cincho-tannic acid evolves a very slight odor of carbolic acid. The distillates diluted with water, produces all those reactions by which R. Wagner characterizes phenylic acid, a diluted solution of perchloride of iron produces a green color without any precipitate, and on the addition of ammonia this changes into red. This aqueous solution also absorbs oxygen with great avidity from the air, on the addition of an alkali.

If it should be proved by additional experiments, that by the dry distillation of cincho-tannic acid, phenylic acid is actually generated, it would indicate a close relation between the constitution of this acid and kinovic acid, which latter acid yields, according to Wöhler, besides other products, carbolic acid. A combination of pure cincho-tannic acid with oxide of lead, dried in a vacuum at 212° Fah., gave the following numbers:

Carbon	47.92	12 = 72	46.67
Hydrogen	4.85	7 = 7	4.63
Oxygen.........	47.23	9 = 72	47.70
	100.00	151	100.00

An aqueous solution of pure cincho-tannic acid exposed to the air, became turbid on the addition of water, and a reddish-brown substance was precipitated, which, washed with water and dried at 212° Fah., had the following composition:

Carbon........	55.35	36 = 216	55.38
Hydrogen.....	5.68	22 = 22	5.64
Oxygen........	38.97	19 = 152	38.98
	100.00	390	100.00

The formula $C_{36}H_{22}O_{19}$, can be reduced to $3(C_{12}H_7O_6)+HO$. By the addition of sulphuric acid to the aqueous solution after filtration from the substance described above, a reddish precipitate was thrown down very similar to the former, and which dissolved readily in alcohol, but much less so in water. It consisted of:

Carbon.........	38.87	12 = 72	38.91
Hydrogen......	4.81	9 = 9	4.86
Oxygen........	56.32	13 = 104	56.23
	100.00	185	100.00

This substance may be regarded as a hydrate, $C_{12}H_9O_{13}=C_{12}H_7O_{11}+2HO$. According to this view there existed three compounds, which contained for 7 equivs. of carbon and 7 equivs. of hydrogen, 6.9, and 11 equivs. of oxygen.

$$3(C_{12}H_7O_6)+HO.$$
$$C_{12}H_7O_9$$
$$C_{12}H_7O_{11}+2HO.$$

If the composition of hydrate of cincho-tannic acid be expressed by the formula $C_{14}H_8O_9$, and the formula of that product of oxidation containing the least proportion of oxygen $=C_{12}H_7O_6$, be deducted from this, the formula of the anhydrous formic acid C_2HO_2 is left. If, therefore, two equivs. of oxygen are added to the equiv. of cincho-tannic acid, the latter forms 1 equiv. water, 2 equivs. carbonic acid, and 1 equiv. oxygen in the above-described substance, $C_{12}H_7O_6$, which by further addition of oxygen may form $C_{12}H_7O_{11}$. The generation of carbonic acid simultaneously with red Cinchonic has been already proved by Berzelius.

Red Cinchonic, or Cinchona Red.—Powdered Cinchona bark, deprived by boiling of all substances soluble in water, was exhausted by diluted ammonia, and the intensely reddish-brown liquid let fall, when treated with an excess of muriatic acid, kinovic acid and red Cinchonic in the shape of voluminous reddish-brown flakes. These were collected on a filter, washed with water, and boiled with diluted milk of lime; the red Cinchonic forms thus with the lime a combination, insoluble in water, while the kinovate of lime is dissolved by water. The compound of red Cinchonic with lime washed with water was heated with diluted muriatic acid, placed upon a filter, and washed with water, till the filtered liquid was no longer clouded by nitrate of silver. The red Cinchonic, which had thus been freed from lime, was re-dissolved in diluted ammonia, and precipitated by muriatic acid, perfectly exhausted with water, dissolved in spirit of wine, and the liquid filtered from the flakes, and evaporated in the water-bath to dryness. The red Cinchonic thus obtained formed a chocolate-brown mass, nearly insoluble in water, which dissolved with greatest facility in alcohol, ether, and alkalies, with an intensely red color. Dried at 212° F., the analytical result was:

Carbon	53.63	12 = 72	53.33
Hydrogen.......	5.36	7 = 7	5.19
Oxygen..........	41.01	7 = 56	41.48
	100.00	135	100.00

The cincho-tannic acid ($C_{41} H_8 O_9$) must absorb 3 eq. of oxygen in order to be able to form 1 eq. of this red Cinchonic, 2 eq. carbonic acid, and 1 eq. of water. When a solution of cincho-tannic acid, mixed with a few drops of liquid ammonia, is brought in contact with atmospheric air in a glass tube, the volume of the air is rapidly lessened by the absorption of oxygen. When the absorption has ceased, carbonic acid gas is developed upon the application of a few drops of sulphuric acid, which, with regard to the volume, amounts to much less than the quantity of the absorbed oxygen; at the same time flakes of a reddish-brown substance, inclosing red Cinchonic, separate from the liquid. The tendency of the tannic acid, when combined with a base, to absorb oxygen, is the reason why so small a proportion of cincho-tannic acid is contained in bark, while that of the red Cinchonic is much larger; and even of this small quantity a large portion is lost by its being changed into red Cinchonic during the preparation, which requires a number of operations in order to remove all other substances. All these experiments were performed in the laboratory of Prof. Roehleder.—*Central Blatt*, 1852, *No. XIII.*, *p.* 194."

Chinoidin, *Quinoidin*, *or Amorphous Quinia.*—This body is a modification of quinia, deprived, however, of its crystallizing property, but when pure has the same medicinal power as quinia. On Chinoidin or Quinoidin, and β-Quinia, or Quinidina, J. Van Heijningen remarks as follows:

"The following investigation was made with commercial quinoidin obtained in Holland. It is entirely soluble in acids and alcohol; but leaves in ether a residue from twelve to fifteen per cent., according to the different kinds. It neutralizes acids, and burns with an agreeable odor, leaving scarcely any residue. Elementary analysis of the entire mass furnished dissimilar results, the carbon and nitrogen being higher (as much as one per cent.) in proportion to its greater solubility in ether. This quinoidin consists of a mixture of at least four to five substances, viz., 1st, quinia (the α-quinia of the author); 2d, Cinchonia; 3d, a base of very peculiar properties, which the author calls β-quinia; and 4th, of a resinous colorless substance, which, however, readily becomes brown in the air. The quinoidin was treated in three different manners.

I. *Treatment.*—100 grms, of quinoidin were exhausted with as little ether as possible, and the brownish-yellow solution separated from about fourteen grms. of a blackish-brown residue. The solution is decolorized with animal charcoal or the ether first removed by distillation; the residue dissolved in dilute sulphuric acid, and this solution treated with animal charcoal. The decolorized liquid is precipitated with ammonia, and the washed precipitate dissolved in ether. The ethereal solution obtained in either way is mixed with one-tenth its volume of alcohol of 0.833 spec. grav., and left to evaporate spontaneously in a cool place. When the greater portion of the liquid has evaporated a considerable amount of crystalz of β-quinia have separated, which were purified by washing with alcohol.

The alcoholic liquid decanted from the β-quinia was, after further evaporation, accurately saturated with sulphuric acid, and the remainder of the alcohol removed by evaporation. On cooling, crystals of β-quinia, having great resemblance to the sulphate of quinia, separated from this solution. The mother ley furnished a further quantity of these crystals, which were mixed with crystals of the ordinary sulphate of quinia and a dark-brown coloring substance.

All the crystals of β-quinia are collected and purified by recrystallization from hot water. The ordinary sulphate of quinia is separated by dissolving the crystals in cold water with the assistance of a few drops of sulphuric acid, precipitating the solution with ammonia, carefully washing the precipitate, and dissolving it after desiccation in alcohol of 0.833 spec. grav. On slow evaporation the β-quinia crystallizes, while the α-quinia remains dissolved in the alcohol.

The dark-brown resinous residue left untouched by the ether is dissolved in dilute sulphuric acid, decolorized with animal charcoal, and precipitated with ammonia; the dry precipitate is dissolved in hot alcohol, and set aside to crystallize; it is this portion of the quinoidin which contains the Cinchonia, which now gradually separates, while the brown coloring substance remains in solution.

II. *Treatment.*—100 grms. of quinoidin were dissolved in ether, the solution decolorized with animal charcoal, and the ether removed by careful distillation. The residual yellow resinous substance was accurately neutralized with dilute sulphuric acid, and the solution evaporated at a gentle heat, when a quantity of crystals separated on cooling.

These crystals were considered by Winckler to be ordinary sulphate of quinia, but this is an error; they are sulphate of β-quinia with a slight admixture of the former. The liquid separated from these crystals is concentrated until no further crystals separate, then dissolved in water, and decolorized. According to Winckler, ammonia precipitates from it pure quinoidin or amorphous quinia.

But if this precipitate, after having been dried, is dissolved in ether to which a little acid has been added, and the solution is left to evaporate spontaneously in a cool dry place, some more crystals of β-quinia are obtained from it. The separated liquid is saturated with dilute sulphuric acid; the alcohol evaporated. There is obtained on cooling, as in the first method, a further large amount of sulphate of β-quinia; the remainder of the liquid at last solidifies to a paste of crystals.

According to this method, therefore, the same results are obtained according to I., only with greater loss of material and time; for the β-quinia is decomposed under the influence of acids and heat, apparently by the presence of a colorless substance, which becomes brown and resinous in the air, so that it requires to be frequently decolorized, because these products of decomposition prevent the crystallization of the β-quinia, still in solution.

III. *Treatment.*—100 grms. quinoidin were dissolved in dilute muriatic acid, the solution decolorized with animal charcoal, and precipitated with ammonia. The white flocculent precipitate soon contracted into a resinous cake, which became brown in the air. The well-washed and dried precipitate was dissolved in alcohol of 0.833 and concentrated; the dark solution deposited on cooling crystals which appeared to be pure Cinchonia; after further evaporation the thick liquid was treated with ether, when more, nearly pure, Cinchonia was obtained. The ether is removed by cautious distillation; the residue in the retort saturated carefully with sulphuric acid, when, on evaporating the solution, a large amount of β-quinia separates. The mother ley is evaporated until no more crystals are deposited on cooling; it is then dark brown, and water precipitates from it a blackish-brown resinous substance. After the separation of this substance the liquid is again precipitated with ammonia, and the precipitate dissolved in sulphuric acid. This last precipitation renders the evaporation of a large amount of liquid unnecessary, in which operation it would again become brown. The concentrated sulphuric solution gave on cooling crystals which consisted of a mixture of α and β quinia, which were separated in the manner above described. The liquid separated from these crystals was decolorized, precipitated by ammonia, the dry precipitate dissolved in ether, and treated as above.

Of these three modes of treatment, the first is certainly preferable, because a larger portion of the β-quinia is separated before acids and heat are applied. Pure β-quinia is as little changeable as α-quinia or Cinchonia; it is only when mixed with other substances that it is so readily decomposed. If Winckler's pure quinoidin be kept for some time in closed glass vessels, it becomes darker at the surface; and this takes place very rapidly if the pale yellow-colored quinoidin is kept fused for a couple of hours in a water-bath, or when it is dissolved in alcohol or in dilute acids and heated; the color then soon passes from a pale-yellow into a dark brown.

When the colorless quinoidin of Winckler is dissolved in dilute sulphuric acid so as to form a perfectly neutral solution, and it is then heated for a few hours until the color has become dark brown, few or no crystals of β-quinia separate on cooling. From such a solution water throws down a black precipitate, and the liquid becomes lighter. If the solution is now precipitated with ammonia, and the precipitate dissolved in warm dilute sulphuric acid so as to form a perfectly neutral liquid, a large quantity of crystals of β-quinia separate; it is therefore beyond all doubt that the presence of the black substance prevents the separation of the crystals.

The fourth substance above mentioned can also be obtained colorless; it exists in the colorless state in the mixture with β-quinia, which Winckler calls pure quinoidin; in commercial quinoidin it is present partly in the colorless state and partly of a brown color, having been oxidized by the oxygen of the atmosphere. This product of oxidation would consequently form the fifth constituent of quinoidin. However, from the author's experiments, nothing accurate can be stated of this substance, except that it is not an alkaloid, and is probably free from nitrogen; for the following analyses correspond to a mixture of the Cinchona alkaloids with a non-nitrogenous substance. I., II. are the found results with quinoidin; III. the calculated composition of quinia; IV. the calculated composition of Cinchonia:

	I.	II.	III.	IV.
Carbon	72.81	72.69	74.1	78.0
Hydrogen	7.30	7.30	7.4	7.8
Nitrogen	8.47	8.89	8.6	9.1

It should be observed that the β-quinia in the anhydrous state has the same composition as α-quinia. It results, then, from the above numbers, that the quinoidin of commerce must contain, besides α and β-quinia and cinchonia, a fourth substance, containing less carbon and hydrogen than quinia. In order to obtain further information on this point the substance considered by Winckler to be pure quinoidin, but which is a mixture of β-quinia and of a substance which turns brown in the air, was analyzed. On drying, the colorless substance became brown, and consequently the analysis has no value in reference to its composition; but it is only intended to prove that the supposed amorphous quinia can not have the composition of quinia. A sample of this substance, dried at 266°, and which had become brown, furnished on analysis 74.441 carbon, 7.491 hydrogen, 7.466 nitrogen, and 10.602 per cent. oxygen. The quantities of hydrogen and carbon are the same, but the amount of hydrogen is one per cent. less than in quinia.

It is evident, therefore, that the so-called amorphous quinia, even when prepared according to the method directed by Winckler, is still a mixture.

β-quinia, or chinotin, $C_{20}\ H_{12}\ NO_2+2\ Ho$.—It will be seen from the following, especially from the nature of the salts, that this is a very peculiar alkaloid, which in the anhydrous state has the same composition as anhydrous α-quinia; but it decidedly differs from it in the hydrated state; the α-base combines with 3 equivs. water, the base β with only 2. In some salts the latter likewise contains less water of crystallization than α-quinia. When prepared according to the methods previously described, it has the following properties: It crystallizes from ethereal hot alcoholic solutions in large, transparent, klinorhombic prisms, which become white and opaque in the air, without, however, falling to powder. At 320° it melts to a colorless liquid, which forms on cooling a transparent resinous mass; when heated upon platinum foil, it burns with an agreeable smell, resembling the odor of Melilotus. At 46° it dissolves in 1.500 parts water, in 45 parts of absolute alcohol, and 90 parts of ether, while of boiling alcohol it requires only 3.7 parts and of boiling water 750 parts; from which solutions it again separates for the greater part on cooling. In this respect it differs essentially from α-quinia and from Cinchonia.

The cold aqueous solution has a feeble alkaline reaction, is rendered turbid by alkalies, and furnishes a white precipitate with tannic acid, while nitrate of silver and protonitrate of mercury produce no change in it. The substance dried at 266° gave on analysis:

Carbon	74.08	20=1500	74.076
Hydrogen	7.44	12= 150	7.405
Nitrogen	8.55	1= 175	8.642
Oxygen	9.93	2= 200	9.877

In the drying at 266° it loses 10.8 per cent. of water, which corresponds to 2 equivs.; so that the formula of the hydrated substance is that given above, while in the anhydrous state it is $C_{20}\ H_{12}\ NO_2$. This is precisely the composition of α-quinia.

Salts of β-Quinia.—β-quinia forms, like α-quinia, basic and neutral salts, which have a very bitter taste. Some are more readily soluble than the corresponding salts of α-quinia; for instance, the oxalate, tartrate, and acetate; on which account neutral oxalates, tartrates, and acetates produce no precipitate in solutions of a salt of β-quinia, while a precipitate is formed in those of the corresponding salt of α-quinia. Some, on the other hand, are more insoluble; for instance, the muriate and nitrate of β-quinia.

Basic Muriate of β-quinia, $2\ \beta Ch+ClH+2\ HO$, is easily procured by saturating the base with dilute muriatic acid. It crystallizes in very transparent white crystals, is soluble in alcohol and water, and differs from the corresponding muriate of quinia only by containing 1 equiv. less water. The air-dried salt lost at 248° 4.79 per cent. water. The air-dried salt furnished on analysis:

β-Quinia	...	2=4050.0	85.2
Muriatic acid	9.48	1= 455.5	9.9
Water	4.79	2= 225.0	4.9

The corresponding salt of α-quinia contains 3 equivs. of water.

Chloroplatinate of β-quinia, $\beta CH,\ HCl+PtCl_2+2\,HO$.—The preceding salt, dissolved in water with the assistance of a few drops of muriatic acid, furnishes, with an excess of neutral chloride of platinum, an orange-colored precipitate, which, when washed and dried, appears to consist of 1 equiv. chloride of platinum, 1 equiv. muriate of β-quinia, and 2 equivs. water. The air-dried salt lost 4.86 per cent. of water at 212°. It has, consequently, the same composition as the corresponding double salt of α-quinia. The air-dried salt furnished on analysis :

Pt	26.25	1=1232	25.6
Cl	27.85	3=1333	27.6
HO	4.86	2= 225	4.8
$\beta Ch+H$	42.55	1=2026	42.0

Neutral Muriate of β-quinia is obtained when dry muriatic gas is passed over β-quinia dried at 266°. It crystallizes from the solution in water, which was not found to be the case with α-quinia, which was treated in the same manner for comparison ; this latter formed on evaporation a gelatinous mass. 100 parts of β-quinia, dried at 266°, absorbed 22.518 per cent. of muriatic acid gas ; 100 parts of α-quinia, dried at 212°, absorbed 22.864 per cent.; the same quantity therefore. The calculated amount for these neutral salts is 22.4 per cent.

Basic Sulphate of β-quinia, $2\beta Ch+SO_3+6\,HO$.—Its preparation has already been described ; it has a striking resemblance to the corresponding salt of α-quinia, but is more woolly and soft to the touch ; it dissolves at 50° in 32 parts of absolute alcohol and in 350 parts of water, while the salt of α-quinia requires 740 parts of water at the same temperature. Moreover, the α-salt contains 7 equivs. of water.

The air-dried salt, heated to 266°, lost 12.838 per cent. of water. The air-dried salt furnished on analysis :

β-Quinia	...	2=4050	77.5
Sulphuric acid	9.58	1= 500	9.6
Water	12.84	6= 675	12.9

Neutral Sulphate of β-quinia is readily obtained by adding a few drops of sulphuric acid to the solution of the preceding salt and evaporating. It crystallizes, but is very soluble in cold water.

Nitrate of β-quinia.—An excess of β-quinia is digested with dilute nitric acid, filtered, and evaporated ; it forms large crystals with a vitreous luster. It differs from the corresponding α-quinia salt, as this does not crystallize under similar circumstances ; it must be first evaporated to expel the excess of acid, and be then dissolved in water, when it is also obtained crystallized.

Oxalate of β-quinia, β-Ch, C_2O_3+HO, can not be obtained by precipitating a salt of β-quinia by an oxalate, as is the case with α-quinia, on account of its easy solubility. The base is, therefore, accurately saturated with the acid. From hot saturated solutions it separates on cooling in crystals with a nacreous luster. The air-dried salt, when heated to 248°, lost 4.32 per cent. =1 equiv. water. It has, therefore, the same composition as the corresponding salt of α-quinia. On analysis it furnished:

β-quinia	...	1=2025.0	78.3
Oxalic acid	16.58	1= 450.0	17.4
Water	4.32	1= 112.5	4.3

Tartrate of β-quinia is obtained with tartaric acid in the same manner as the preceding. It forms nacreous crystals.

Acetate of β-quinia is very easily soluble, and, therefore, difficult to obtain in crystals; if, however, its solution is evaporated to a syrupy consistence, some beautiful transparent crystals form in it in the course of a few days, which are distinguished in appearance from the nacreous crystals of the acetate of α-quinia.

From this similarity, we may conclude that the β-quinia is likewise a febrifuge. Bauduin has found it to be quite as effective in cases of intermittent fever as α-quinia. Should this result be confirmed, the price of the preparations of quinia will be considerably reduced; for 100 parts of unadulterated quinoidin furnished—

3 per cent. of α-quinia,
From 6 to 8 per cent, cinchonin, and
From 50 to 60 per cent. β-quinia,

in an operation which, executed upon a large scale, would furnish a still greater amount of produce. The preparation of β-quinia is likewise not very expensive.—*Scheikund, Onderzoeck, part V., No.* 4, *p.* 234."

Quinidin or *Quinidina*, $C_{36}H_{22}N_2O_2$, equivalent weight 282, and symbol $\overset{+}{Q}$dn, is a new alkaloid, recently discovered in the new barks, and found also in the C. ovata, C. cordifolia, C. lancifolia, etc. It is obtained by the same process as that by which quinia is procured from the quinia-yielding barks; but its sulphate, being very soluble, is left in the mother-waters. In order to obtain the alkaloid pure, it is to be repeatedly crystallized from its alcoholic solution to deprive it of a greenish-yellow resinous substance, and then shaken with ether, to remove any adherent quinia, until the ethereal liquor no longer indicates the presence of quinia by yielding a green color on the addition first of chlorine water, and afterward of ammonia. Pereira states that an acidulated aqueous solution of quinidin is fluorescent, and possesses the property of left-handed polarization.

H. G. Leers describes the chemical composition of quinidin as follows:

"Quinidin, discovered several years ago by Winckler,* in a bark resembling Huamalies Cinchona, and also in Maracaibo Cinchona, has never yet been subjected to an accurate analysis, although this base appears to be daily acquiring a greater importance in relation to quinia.

In consequence of the government of Bolivia having monopolized the exportation, and by this means raised the price of *Calisaya Cinchona* (the principal material for the manufacture of quinia), a cheaper bark is now imported, under the name of Bogota Cinchona,† which contains chiefly quinidin, and but a small proportion of quinia.‡

From this Bogota Cinchona, large quantities of quinidin are now prepared for admixture with quinia. The proportion of alkaloids in this bark was, in two experiments, 2.61 and 2.66 per cent. It appeared, therefore, of great interest to obtain a more exact knowledge of the chemical relations of this substance, which, in the crude state in which the author received it from Mr. Zimmer, was beautifully white and distinctly crystallized, but still not perfectly pure. It contained an uncrystallizable yellowish-green resinous substance, together with quinia (according to the test with chlorine water and ammonia), and very probably also a third substance, containing a larger proportion of carbon.

The following operations were performed in the laboratory of Prof. Will:

In order to obtain the base in a perfectly pure state, the rough quinidin was dissolved in alcohol of 90 per cent., and the solution allowed to evaporate spontaneously in the air, when a greenish-yellow, resinous substance soon appeared on the walls of the vessel. The most beautifully formed crystals were then selected, washed with alcohol, and re-dissolved in spirit of wine, when the same greenish-yellow substance was deposited. The re-crystallization having been performed five or six times, until the yellow substance was no longer perceived, and the proportion of carbon in the base not yet proving uniform, the crystals obtained after five or six times repeated re-crystallization were finely powdered and shaken with ether, until all reaction of quinia disappeared, and the proportion of carbon remained constant.

If quinidin be dissolved in spirit of wine of 90 per cent., and the solution left to spontaneous evaporation, it forms colorless, hard prisms, shining like glass, with edge-angles of 86° and 94°; the planes of the prisms are strongly striped, these stripes being also observable on the planes of truncation of the more obtuse edges of the prism; and in the direction of the latter planes the crystals admit of perfect cleavage. The crystals are terminated by shining planes, which converge at 114° 30′, and are applied on the more acute edges of the prism.

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* Buchner's *Repert. d. Pharm.* [2] xlviii. [See also a paper in the *Pharmaceutical Journal*, vol. vii., p. 527.]

[† The bark here called *Bogota Cinchona* is usually known in England as a Carthagena bark; and to distinguish it from the common hard Carthagena bark, it is sometimes called *fibrous Carthagena bark*. Coquetta bark is one sort of this bark.—ED. *Pharm Journ.*]

‡ In order to ascertain whether Bogota Cinchona, like other Cinchona barks, contained kinic acid, some finely powdered Bogota bark was boiled with hydrate of lime and the obtained kinate of lime submitted, along with peroxide of manganese and sulphuric acid, to distillation, by which was obtained a liquid containing kinone.

The rather hard crystals are easily rubbed to a snow-white powder, which becomes electrical by friction. If the crystals be heated in a platinum crucible over the flame of spirit of wine, they at first retain their brilliancy and form, and fuse without decomposition, and without yielding water, at 175° C., and form a clear, wine-yellow liquid, which, when cold, solidifies into a grayish-white crystalline mass. If the heat be increased above 175°, the wine-yellow fluid ignites, burns with a red, vividly flaring, strongly sooty flame, evolving at the same time an odor of kinoyl and of oil of bitter almonds, and leaves behind a voluminous easily combustible charcoal. The taste of quinidin is not so intensely bitter as that of quinia.

In order to determine its solubility, quinidin was rubbed down with water of 17° C., and shaken. 36.1 grammes of the solution left after evaporation 0.014 grms. of quinidin dried at 100°; one part of quinidin, therefore, was soluble in 2,580 parts of water at 17°.

42.7 grms. of pure quinidin dissolved in water at 100°, and treated as before, left 0.023 grms. of quinidin = 1 part to 1,858 parts of water at 100° C.

The solubility in ether was determined by shaking finely powdered pure quinidin with ether of 0.728 spec. grav. at 17°; 19.4 grms. of this solution, by evaporation yielded 0.137 grms. of quinidin dried at 100°, or 100 parts of the solution contain 0.70 of quinidin. According to Winckler, 100 parts of ether dissolve 0.6923 parts of quinidin. One part of quinidin dissolves in 12 parts of alcohol of 0.835 spec. grav. at 17°.

Analysis of Quinidin.—1. *Crude quinidin* finely powdered and dried at 110° until it lost nothing, yielded—

	I.	II.
Carbon, - -	77.34	77.02
Hydrogen, - -	7.86	7.90

2. *Pure quinidin*, obtained by being four or five times re-crystallized from alcohol, finely triturated and shaken five or six times with ether, till chlorine water and ammonia produced no reaction of quinia, was washed with water and dried at 110°, till the weight remained constant. The results were—

	I.	II.	III.	IV.	V.	VI.	VII.
Carbon, -	76.88	76.82	76.79	76.40	76.55	76.49	—
Hydrogen,	7.70	7.76	7.77	7.73	7.70	7.81	—
Nitrogen,	—	—	—	—	—	—	9.99

With reference to the analysis of the salts of quinidin, and the determination of the atomic weight of the base from the proportion of platinum in the platinum double salt, the following formula is calculated for quinidin:

$$C_{36}H_{22}N_2O_2.$$

		Calculated.		Average of the Experiments.
36 equiv.	Carbon,	216	76.59	76.66
22 "	Hydrogen,	22	7.80	7.74
2 "	Nitrogen,	28	9.93	9.99
2 "	Oxygen,	16	5.68	—
1 "	Quidinin =	282	100.00	

If quinidin be subjected with hydrate of potash and a small quantity of water to distillation, a yellow oleaginous substance is obtained, which reacts as an alkali, and possesses all the properties of quinolin. Repeatedly washed with distilled water, it yielded a beautifully yellow oily liquid, from which muriatic acid and chloride of platinum threw down an orange-yellow precipitate, which, after having been perfectly exhausted by cold water, was dissolved in hot water. When cold, the platinum salt precipitated from the solution in the form of small orange-red needles. Dried at 110°, 0.695 grms. of the platinum salt yielded, after being burnt, 0.204 grms. of platinum = 29.35 per cent. If the formula for quinolin, $C_{18}H_7N$, be correct, that of the platinum salt of quinolin would be $C_{18}H_7N$, HC_4PtCl_2, and the salt would contain 29.47 per cent. of platinum.

Finely powdered quinidin dissolves in chlorine water without any particular phenomenon; quinia and Cinchonia have the same relation to chlorine water. But if ammonia be added to these solutions, the Cinchonia falls down from the Cinchonia solution of a white color, the quinia solution becomes green like grass, and the quinidin solution remains unaltered. The reaction upon quinia becomes still more sensible by ether, if the substance to be tested for quinia be first finely powdered, then shaken with ether, and to the ether, chlorine water and ammonia be added, the least trace of quinia may be detected by the liquid becoming green. By this test, the absence or presence of quinia could very easily be detected in the preparation of the quinidin salts.

Salts of Quinidin.—Most of these salts are much more readily soluble in water than the salts of quinia. In spirit of wine, they dissolve very easily, in ether scarcely at all. There are acid and neutral salts of quinidin, of which there are but few which are not distinctly crystallizable; some furnish beautiful large crystals with a vitreous brilliancy. The aqueous solutions of the quinidin salts yield with potash, soda, and ammonia, the mono- and the bicarbonates of the alkalies, white pulverent precipitates, which crystallize after long standing, and are insoluble in an excess of the precipitant.

Phosphate of soda, bichloride of mercury, and nitrate of silver, yield white precipitates. Chloride of gold gives a light yellow, chloride of platinum an orange yellow, and chloride of palladium a brown precipitate. Sulphocyanide of ammonium yields a white, and tannic acid a dirty yellow color, with the salts of quinidin.

Neutral Sulphate of Quinidin.—This salt was prepared by dissolving quinidin in diluted sulphuric acid, till the latter was neutralized. The neutral solution having been evaporated in the water-bath, yielded by cooling long silky shining acicular crystals, arranged in star-like groups, of sulphate of quinidin, the watery solution of which was neutral. In order to establish the solubility of this salt, the crystals were rubbed down with water of 17°, and then some time shaken. The perfectly saturated solution was afterward filtered, 43.1 grms. of the filtrate were evaporated to dryness, and the residue dried at 110°, the result was 0.325 grms. of sulphate of quinidin. It required, therefore, 130 parts of water at 17° to dissolve one part of the sulphate.

33.5 grms. of a solution saturated at 100°, yielded, after being evaporated and dried at 100°, 1.904 grms. of the salt = one part of the salt in 16 parts of water. Sulphate of quinidin dissolves very readily in alcohol, but is almost insoluble in ether. Analysis of 100 parts:

	Found.					
	I.	II.	III.	IV.	Average.	Calculated.
Carbon.............	64.70	64.79	—	—	64.75	65.25
Hydrogen.........	7.18	6.91	—	—	7.05	6.95
Sulphuric acid....	—	—	11.99	12.02	12.01	12.08

Corresponding formula: $C_{36}H_{22}N_2O_2, SO_3 HO$.

Acid Sulphate of Quinidin.—The salt was obtained by adding to the neutral sulphate as much acid as it already contained.

The clear, very acid, and strongly opalizing solution was evaporated in the water-bath, and then placed under the air-pump, over sulphuric acid. After the solution had arrived at the consistency of a syrup, and had assumed an intensely brown color, a crystalline mass of rather thick asbestos-like needles of a slight yellow color was formed. These crystals, after being removed from the mother-liquor, were washed with a mixture of alcohol and ether, and pressed between folds of filtering-paper, which did not deprive them of their yellowish color. The proportion of sulphuric acid in the salt varied considerably several times, which arose very likely from the presence of some neutral sulphate, and for this reason no analysis is given.

Neutral Hydrochlorate of Quinidin.—Pure quinidin was finely powdered and mixed with water, then as much muriatic acid added by drops with the addition of heat, till the whole of the quinidin was dissolved, and the solution was neutral to test-paper. By the spontaneous evaporation of the solution the muriate of quinidin was obtained in the form of large rhombic prisms of a vitreous luster. The mother-liquor yielded no crystals, even ft er having been evaporated to the consistency of a syrup and left standing for several weeks in the dry air. The solubility was determined by rubbing down the crystallized salt with water of 17°, and shaking, till the latter took up no more salt. Of the filtered liquid 7.067 grms. were evaporated, and the residue dried at 100° weighed 0.252 = 1 part of the salt, therefore, required 27 parts of water. Alcohol dissolved the salt very easily, ether scarcely at all. Analysis showed in 100 parts:

	Found.				
	I.	II.	III.	IV.	Calculated.
Carbon............	64.57	64.11	—	—	64.19
Hydrogen.......	7.28	7.06	—	—	7.13
Chlorine.........	—	—	9.95	10.16	10.54

Corresponding formula: $C_{36}H_{22}N_2O_2$, 2 H Cl, 2 HO.

Acid Hydrochlorate of Quinidin.—To the last salt as much muriatic acid as it already contained was added, and the solution left to evaporate spontaneously, yielded beautiful, large, slightly yellowish crystals, which are monoklinometric and have the appearance of rhombic prisms.

Perfectly dried over sulphuric acid at 100° the acid muriate of quinidin lost 5.8 per cent. of water. It is easily soluble both in water and spirit of wine. In 100 parts were:

	Found.			
	I.	II.	III.	Calculated.
Carbon.	58.30	—	—	57.93
Hydrogen.......	7.12	—	—	6.97
Chlorine.........	—	18.96	19.00	18.99

Corresponding formula: $C_{36}H_{22}N_2O_2$, 2 H Cl+2 HO.

Platinum-Chloride of Quinidin.—The most beautiful crystals of the muriate of quinidin were dissolved in water, the solution diluted, acidulated with muriatic acid and chloride of platinum added as long as a precipitate was obtained. The orange-yellow precipitate was then placed on a filter and washed with acidulated water till chloride of platinum was no longer detected in the washings. The precipitate dried at 110°, was burnt, and gave the following results. In 100 parts were:

	Found.			Average of experiments	calculated.
	I.	II.	III.		
Platinum	27.05	27.17	27.13	27.11	27.04

These numbers correspond to the formula:

$$C_{36}H_{22}N_2O_2,\ 2\ H\,Cl,\ 2\ Pl\,Cl_2+4\ HO.$$

Mercury-Chloride of Quinidin.—Pure quinidin was dissolved by the aid of heat in alcohol of 85 per cent., acidulated with muriatic acid and an equal weight of bichloride of mercury dissolved in ether, added to the solution. When the mixture had become cold the mercury-chloride of quinidin was obtained in the form of small scaly pearly crystals, which dissolved with great difficulty in water. The crystals were placed on a filter, thoroughly washed and pressed between folds of filtering-paper; when dried over sulphuric acid they lost no water at 110°. In 100 parts were:

	Found.					
	I.	II.	III.	IV.	V.	Calculated.
Carbon.........	34.77	—	—	—	—	34.52
Hydrogen.....	4.01	—	—	—	—	3.83
Quicksilver...	—	31.98	31.91	—	—	31.97
Chlorine......	—	—	—	22.60	22.31	22.63

Corresponding formula: $C_{36} H_{22} N_2 O_2$, 2 H Cl, 2 Hg Cl.

Nitrate of Quinidin.—If pure quinidin be dissolved by the aid of heat in moderately diluted nitric acid until the solution is neutral to test-paper, and the strongly opalizing mixture evaporated over sulphuric acid, the nitrate of quinidin crystallizes after some time in beautiful large warty crusts, resembling enamel. If the mother-liquor be allowed further to evaporate, a hemispherical white mass, resembling wax, forms on the surface, while the liquid becomes slightly green. This salt readily dissolves in water.

Chlorate of Quinidin.—By the mutual decomposition of neutral sulphate of quinidin and chlorate of potash, this salt was obtained in a perfectly pure state after having been re-crystallized from alcohol of 90 per cent. It forms long, white silky prisms grouped in tufts. By a gentle heat it fuses into a transparent mass, but explodes very violently at higher temperature.

Hyposulphite of Quinidin.—It was obtained by the mutual decomposition of neutral sulphate of quinidin and hyposulphate of soda. When the solution cools, the hyposulphate of quinidin crystallizes in thin, long asbestos-like needles. In water this salt dissolves with some difficulty, but very soluble in ether.

Fluate of Quinidin.—Pure quinidin in fine powder was suspended in water and placed in an apparatus for the development of fluoric acid; after some time, the quinidin contained in the water entirely dissolved and a clear intensely acid, slightly opalizing liquid was obtained. The solution was left to spontaneous evaporation, and yielded a mass of fluate of quinidin, consisting of white, silk-like crystalline needles, which dissolved with great readiness in water. Upon the addition of chloride of calcium a precipitate was formed, which was insoluble in acetic acid.

Acetate of Quinidin.—This compound is obtained by dissolving by the aid of heat finely powdered quinidin in diluted acetic acid. When cold the acetate of quinidin appears in the form of thin, long, silky needles, which do not easily dissolve in cold water. When dried, the salt easily loses part of its acid. On removing the first crystals and allowing the mother-liquor to evaporate spontaneously, a salt crystallizes from it, consisting of a mass of semi-globularly-grouped, small pointed needles, having an appearance of porcelain. This salt is by far more soluble in water than that above-mentioned.

Oxalate of Quinidin.—If an alcoholic solution of oxalic acid be added to an alcoholic solution of quinidin with the application of heat, till the liquid is neutral to test-paper, the oxalate of quinidin crystallizes from the solution after the latter has become cold, in the form of long, white, silky needles, which dissolve with great difficulty in water. From the spontaneously evaporated mother-liquor a salt in the shape of warty crusts with an opaque white appearance crystallizes, which dissolves with less difficulty in water.

Tartrate of Quinidin.—With tartaric acid quinidin forms two compounds, which appear to possess great resemblance to the oxalates. On saturating tartaric acid with quinidin, at a boiling heat, a salt separates, when the solution cools, in the shape of small pearly needles, which dissolve, but with great difficulty, in water. The solution of neutral tartrate of quinidin having been allowed to evaporate spontaneously, yielded beautiful vitreous needles, and by the further evaporation of the mother-liquor, small, semi-globular, white, opaque, shining crusts of small needles appeared.

Citrate of Quinidin was obtained by saturating pure quinidin with pure citric acid at a boiling heat. From the cold neutral solution of the citrate of quinidin, small, but slightly glittering needles crystallized, which did not easily dissolve in water.

Formate of Quinidin, obtained by saturating the pure aqueous formic acid with quinidin. The salt forms long, beautiful, silky needles, readily dissolving in water.

Butyrate of Quinidin.—Aqueous butyric acid was saturated with an alcoholic solution of quinidin. The salt crystallized from the neutral solution in large warty crusts resembling porcelain. It was very soluble, and smelt strongly of butyric acid.

Valerianate of Quinidin.—Aqueous valerianic acid being saturated with an alcoholic solution of quinidin, and the neutral solution left to spontaneous evaporation, the salt soon appeared in the shape of warty crusts, in the center of which was a lighter body of a radiating structure. The salt smelt strongly of valerianic acid. The solution of the valerianate of quinidin having been evaporated in the water-bath, the liquid assumed a brown color, emitting a penetrating odor of valerianic acid, while at the same time oily drops were evolved.

Kinate of Quinidin.—Pure kinic acid, dissolved in water was saturated while heated, with quinidin. The spontaneously evaporated neutral solution yielded a white milky mass of small needles, soluble both in water and spirit of wine.

Hippurate of Quinidin.—Pure hippuric acid, dissolved in spirit of wine, was saturated with quinidin under the application of heat. The hippurate of quinidin crystallized from the cold neutral solution in long silky crystals, which had the appearance and shape of fern-leaves. It dissolves readily in water and in spirit of wine.

In comparing the formula for quinidin with those for quinia and Cinchonia, the following relations are established:

$$\text{Quinidin}\quad C_{36}H_{22}N_2O_2.$$

$$\text{Quinia}\quad \begin{cases} C_{38}H_{22}N_2O_4 \text{ (Laurent).} \\ C_{20}H_{12}N_2O_2 \text{ (Liebig).} \end{cases}$$

$$\text{Cinchonia}\quad \begin{cases} C_{38}H_{22}N_2O_2 \text{ (Laurent).} \\ C_{20}H_{12}N\,O \text{ (Liebig).} \end{cases}$$

According to this quinidin differs from Cinchonia by a lesser proportion of two atoms of carbon, while the equivalents of the other elements are the same. An homologous relation between these bases, which appears so very probable, can not, therefore, be established.—*Ann. der Chem. u. Pharm.*, *Mai*, 1852.

Paricin has been found in certain Cinchona barks from Para, by Dr. J. F. L. Winckler, who gives the following process for obtaining it: "If we digest the bitter resin of Para Cinchona with a strong solution of caustic ammonia for a few days, a brownish-yellow, loose powder, of about half its weight, is precipitated, and the supernatant fluid is clear and deep-brown. The precipitate is colored *Paricin*, which may be easily purified. The ammoniacal liquid on being evaporated, leaves a residue of an amorphous, shining, almost black mass, which contains ammonia." Paricin closely resembles aricine, but is more soluble in ether, and is uncrystallizable.

Since the discovery of these new alkaloids the whole subject requires re-investigation.

Pelletier regarded Cinchonia, quinia, and aricina, as being respectively the monoxide, binoxide, and teroxide of a hypothetical nitrogenous base, which he called *quinogen*, and whose formula is $C_{20}H_{12}N$.—*P.* L. Pasteur makes the following remarks on the Cinchona alkaloids: "It is now about half a century since Cinchonia, whose existence had been previously pointed out by Dr. Duncan, of Edinburgh, was first isolated and obtained in a state of purity by Gomez, a physician of Lisbon. He attributed the efficacy of Cinchona barks to the presence of this body; but he failed to recognize its alkaline character, which, indeed, was not fully appreciated till toward the year 1820, by Pelletier and Caventou, at which time the same chemists likewise made the important discovery of quinia. About twelve years later, two other French Chemists, MM. Henry and Delondre, discovered, in yellow Cinchona bark, a third alkaloid, to which they gave the name of *quinidin.* In 1829, Sertürner, already celebrated by his discovery of morphia, observed in the mother-liquors of sulphate of quinia an uncrystallizable base, which he called *quinoidin,* and to which he attributed wonderful febrifuge properties.

The general characters of quinia and Cinchonia are sufficiently well known; but with regard to quinidin and quinoidin, very contradictory opinions still prevail. I think that I have removed all these difficulties.

The results of my investigations likewise exhibit entirely new molecular relations between the several Cinchona alkaloids. The following are the new facts which I have discovered:

1. *Cinchonicin.*—When Cinchonia, in any of its salts, is subjected to the action of heat, it becomes transformed into a new base isomeric with it, but possessing totally different characters. This new base I call *cinchonicin.* Any salt of Cinchonia may be used for the preparation of Cinchonicin; but to render the transformation easy and complete, and prevent it from going too far, the salt of Cinchonia must be placed under certain conditions. In general, when a Cinchonia salt is heated, it immediately melts and decomposes; and if, by any particular artifice, we cause it to melt at a temperature considerably below that at which it decomposes, Cinchonicin is produced; but if the heat be too strong, the new alkali is destroyed. Ordinary sulphate of Cinchonia, for example, when directly heated, melts, and then immediately suffers decomposition, and is converted into a resinous substance of a fine red color, which is a product of the transformation of the Cinchonia. But if the sulphate, before it is heated, be mixed with a small quantity of water and sulphuric acid, it remains melted at a low temperature, even after all the water has been expelled, and if it be kept in this state for three or four hours, between 120° and 130°, it changes completely into sulphate of Cinchonicin. The quantity of coloring matter formed is extremely small, indeed almost imponderable.

I prove, by facts which will be admitted by all chemists, that though heat plays an important part in this transformation of Cinchonia, the vitreous, resinoidal state of the product has nevertheless a real influence upon it; and that the isomerism of this base with Cinchonia is due to transformations of the same kind that we meet with so frequently in mineral chemistry, as in soft sulphur, red phosphorus, and vitreous arsenious acid.

2. *Quinicin.*—All that has been said about Cinchonia is applicable word for word to the salts of quinia. When any salt of this base is heated, new alkaloid is formed, isomeric with it. The conditions necessary and sufficient for insuring this transformation are the same as those above indicated in the case of Cinchonia. To the new base I give the name of *quinicin.* The best mode of obtaining it is to add a small quantity of water and sulphuric acid to commercial sulphate of quinia, and apply a moderate heat. The mass remains liquid even after the water has been completely expelled, and by continuing to heat it for four hours in an oil-bath to a temperature between 120° and 130°, the entire mass may be transformed into sulphate of quinicin, an extremely small quantity of coloring matter being formed at the same time.

In their general properties, Cinchonicin and quinicin exhibit well-marked resemblances to the isomeric bases from which they are derived. They, moreover, resemble each other in the closest manner. Both are nearly insoluble in water, but very soluble in alcohol, whether absolute or of ordinary strength. Both of them unite readily with carbonic acid, and expel ammonia from its salts at ordinary temperatures. Both are precipitated from their solutions in the form of resinous liquids, just like quinia under certain circumstances. Finally, both of them turn the plane of polarization to the right. They are equally bitter, and possess equal febrifugal powers.

3. *Quinidin.*—Allusion has already been made to the contradictions which are met with in the results of different chemists who have examined quinidin. All these contradictions may be attributed to a fact which has escaped the notice of former observers, viz: that the name of quinidin has hitherto been applied indiscriminately to two alkaloids which are totally distinct in their physical and chemical properties, and are almost always mixed together in the quinidin of commerce, unless care has been taken to purify it by several successive crystallizations. Thus, the quinidin discovered in 1833 by Henry and Delondre is totally different from the substance at present known by that name in France and Germany; and the German product often contains a considerable quantity of that which was discovered by Henry and Delondre. The leading characters by which these two alkaloids may be distinguished from one another are the following: one of them, for which I shall retain the name of quinidin, is hydrated, efflorescent, *isomeric with quinia*, turns the plane of polarization to the right, and, like quinia, acquires a green color by the successive addition of chlorine and of ammonia. The other base, to which I give the name of *cinchonidin*, is anhydrous, *isomeric with Cinchonia*, turns the plane of polarization to the left, and does not exhibit any green coloring under the circumstances just mentioned. It is this alkaloid which is most abundant in the samples at present met with in commerce. By exposing recently crystallized Cinchonidin to warm air, it is very easy to see whether it contains any quinidin. All the quinidin crystals effloresce rapidly but without change of form, and separate with a dull white color from the crystals of Cinchonidin, which retain their transparency. The green coloring by chlorine and ammonia likewise affords a useful test.

It appears, then, that the principal bases contained in Cinchona barks are four in number—namely, quinia, quinidin, Cinchonia, and Cinchonidin.

4. *Action of Heat on Quinidin and Cinchonidin.*—These two bases, when subjected to the action of a moderate heat, undergo exactly the same transformations as quinia and Cinchonia—that is to say, *quinidin*, like quinia, is converted into *quinicin*, and *Cinchonidin*, like Cinchonia into *cinchonicin*, the conditions necessary for the transformation being exactly the same as those already mentioned.

The molecular relations indicated by these results assume a new character when we compare the rotary powers of the six alkalies. Consider, in the first place, the three isomeric bodies—quinia, quinidin, and quinicin. Quinia turns the plane of polarization to the left, quinidin to the right, and both to a considerable extent. Quinicin also turns it to the right, but very feebly as compared with the other two. Similarly with Cinchonia, Cinchonidin, and Cinchonicin. Cinchonia and Cinchonidin turn the plane of polarization, the one to the right, the other to the left, and both to a considerable amount; Cinchonicin turns it very slightly to the right. The most rational, or rather the necessary, interpretation of these results appears to be as follows: the molecule of quinia is double, consisting of two active bodies, one of which turns the plane of polarization considerably to the left, the other very slightly to the right. The latter is stable under the influence of heat, and does not undergo any isomeric transformation; but remaining without alteration in quinicin, gives to that body its feeble power of rotation to the right. The other group, which, on the contrary, is very active, becomes inactive when the quinia is heated, and therefore transformed into quinicin. Quinicin, therefore, is quinia, in which one of the constituent groups has become inactive. Quinicin may also be quinidin, in which one of the constituent groups has become inactive; but in quinidin, this very active group turns the plane to the right, instead of to the left, as in quinia, and is, in the same manner, united with the same feeble and unstable group possessing right rotatory power, which remains unaltered in quinicin, and gives to it its feeble rotatory power in that direction. All these observations might be repeated, word for word, with regard to Cinchonia, Cinchonidin, and Cinchonicin, which, in fact, are constituted exactly like their three congeners, for they exhibit precisely the same relations.

5. *Quinoidin.*—This body is always a product of transformation of the Cinchona alkalies. It originates in two different ways. It is produced in the preparation of sulphate of quinia, and especially in the American forests, when the woodman, after having stripped the bark from the tree, exposes it to the sun to dry it. The salts of quinia, Cinchonia, etc., contained in these barks are then transformed into resinous and coloring matters, which constitute the principal part of the quinoidin of commerce. In fact, when any salt of quinia or Cinchonia, either in dilute or concentrated solution, is exposed to the sun, even for a few hours only, it undergoes such a degree of alteration, that the liquid assumes a very deep red-brown color. Further, this alteration is the same as that which takes place at a high temperature. I am therefore of opinion that in the preparation of quinia, Cinchonia, etc., serious loss might be avoided, and the extraction of the alkalies greatly facilitated, if the Cinchona barks were protected from light as soon as they are removed from the trees, and kept in the dark while they are drying. The manufacturer of quinia should carefully avoid the action of a strong light."

The remainder of the constituent principles of the Cinchona barks, being of a less important character than the preceding, I will not enter into any explanation of the means for obtaining them, but proceed to give the several tests for detecting these barks as made known by various chemists.

Tests for Spurious Barks.—As there are many spurious barks in commerce, it is of importance that some ready means for their detection should be made known. Bitterness is not always characteristic of the value of Cinchona bark; barks which do not contain traces of alkaloids and yet contain considerable kinovic acid, have a very bitter taste, which may be mistaken for the presence of alkaloids in the bark. An infusion of such barks will give, upon the addition of a solution of sulphate of copper, a greenish precipitate of kinovate of copper. Tannic acid is the best reagent for determining the genuine from the spurious barks, as this acid forms insoluble compounds (tannates) with the alkaloids of genuine Peruvian barks. In using this test, all that is necessary will be to make a decoction or infusion of the bark under examination, filter it, add a solution of tannic acid, when, should the bark contain any of these peculiar alkaloids, the addition of the solution of tannic acid will immediately cause a precipitate of them as tannates. Consequently those barks which yield no precipitate with tannic acid, are destitute of these alkaloids.*

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* W. Bird Herapath, M. D., makes the following remarks in Bell's London Pharmaceutical Journal, relative to the methods for testing the Cinchona alkaloids: "In consequence of the gradually increasing scarcity of the *cortex cinchonæ calysayæ* and its chief product quinia, many other barks have been introduced into commerce, which furnish alkaloids, having a strong general resemblance in the physical characters of those preparations of them more commonly employed in medicine, but differing widely in medicinal properties and commercial values.

In order to prevent fraudulent adulterations, it has long been highly desirable to have some ready methods of detecting admixtures of these alkaloids and their salts. The author having discovered several optical salts of these vegetable alkaloids, proposes to make their well-marked optical characters the means of such detection, and in a subsequent paper has fully developed his views upon this ready method of analysis, while in the present he has passed under review the various existing tests for the different Cinchona alkaloids, and the results of his investigations may be enumerated under the following conclusions:—

The following different methods of detecting the various Cinchona alkaloids have been proposed:—

To Bouchardat and Pasteur we are indebted for the use of polarized light as a means of discriminating these alkaloids by the rotatory power which they exercise upon its plane.

Liebig employs the difference of their solubility in ether for the same purpose.

Almost all the other tests proposed have for their object only the discovery of quinia.

Professor Stokes employs fluorescence, combined with the peculiar reaction, in respect to this phenomenon, of hydrochloric acid, alkaline chlorides, etc. Brandes, the green reaction produced by the successive addition of chlorine and ammonia, while Vogel has modified the latter test in several ways.

Pelletier has employed the agency of a stream of chlorine gas, and Marchand uses nascent oxygen, obtained from puce-colored oxide of lead and sulphuric acid for the discovery of quinia.

Leers first proposed a combination of Liebig's ether test, with that of Brandes' chlorine and ammonia reaction, as a means of establishing the purity of cinchonidin (miscalled by him quinidin, in common with all German chemists).

Hr. Grahe has also instituted the following ready process for distinguishing the true from the false barks. He finds that true Cinchona bark, when submitted to dry distillation, gives a product of a bright carmine color; this product is characteristic of these barks, and is not furnished by any others that do not contain the Cinchona alkaloids. The quantity of this red substance depends upon the amount of the alkaloids, and it appears to afford a tolerable indication of this amount. This test is applied by heating the fragment of a bark weighing about five or ten grains, in an ordinary test tube, gradually raising the heat to redness. With Cinchona bark a whitish smoke is given off, and also water vapor, which

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De Vry has advised the employment of hydriodic acid or iodide of potassium, in order to discover the quinidin of Pasteur.

Van Heijningen depends on oxalate of ammonia to discriminate quinia from quinidin.

All these different tests the author has examined most critically, and, as far as it is possible to do so, determined the absolute numerical value of each method experimentally with the following results:—

He first explains MM. Bouchardat and Pasteur's researches on these remarkable alkaloids, from which it appeared that quinia and cinchonidin are powerfully lævogyrate, quinidin and cinchonia pre-eminently dextrogyrate, and that quinicin and cinchonicin are only slightly dextrogyrate upon plane-polarized light. These eminent experimenters determined also with accuracy the amount of these molecular rotations for each alkaloid. Yet the expensive nature of the apparatus, the complex formula requisite to reduce the observed amount of angular rotation to the normal molecular standard, and the many interfering actions necessary to be guarded against, effectually prevented this from ever becoming a process for general adoption, either among chemists or manufacturers.

Another method of recognizing the presence of quinia is founded on the optical phenomena of fluorescence, which have been investigated by Professor Stokes. While endeavoring to turn this process to account in the quantitative estimation of quinia by means of excessive dilution, and marking the points at which the various phenomena of "epipolism," "fluorescence," and "internal dispersion" vanish, the author arrived at the following extraordinary results; premising that he employs the term "internal dispersion" to mean the positive, "fluorescence" the comparative, and "epipolism" the superlative degrees of the same optical power:—

I. Solutions containing 1 grain in 35,000 of either quinia or quinidin of Pasteur, exhibit epipolism and fluorescence; solutions with 1 grain in somewhat less than 140,000 grains of water are still fluorescent, with slight internal dispersion.

When diluted with from 3 to 10 gallons of water, these alkaloids continue to exhibit internal dispersion.

Solutions of quinicin are only slightly epipolic, and if the change has been perfect, scarcely at all fluorescent, but nevertheless strongly absorptive of rays of high refrangibility.

Cinchonidin also exhibits optical phenomena, but in a much slighter degree; about 1-100th part of that of either quinia or quinidin.

Cinchonia is also fluorescent about 1-120th part of the same alkaloids.

II. That on mixing fluorescent solutions of quinia, quinidin, or other Cinchona alkaloid with the soluble chlorides, although all traces of optical phenomena are lost to the eye, yet the media still possess powerfully absorbent powers on the rays of high refrangibility, and, if sufficiently concentrated, are wholly opaque to them, without condenses upon the sides of the tube. Very shortly afterward, the red color begins to appear, communicating to the vapor a reddish tinge, and at about one inch distant from the heated portion of the tube, there is deposited a red pulverulent film, which gradually passes into a thick oleaginous liquid, running down the glass in drops or streaks of a fine carmine color, in the water condensed with it. Close to this point are deposited the tarry products, generally resulting from the destructive distillation of vegetable substances. The presence of some substances prevents the production of this red color, even in the case of the true Cinchona barks, such as caustic alkalies, lime, nitric and chromic acids, bichro-

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exhibiting any of the phenomena of dispersion, and greatly impede chemical action. This was proved by three methods of observation:—

1st. By introducing vessels containing fluorescent solutions of quinia into other vessels filled with non-fluorescent solutions of the alkaloids, produced by previous admixture with chloride of ammonium, when all optical phenomena disappeared from the inner vessel.

2ndly. By surrounding fluorescent specimens of fluor-spar with these prepared solutions of the alkaloids, when the blue color in the spar immediately disappeared.

3rdly. By photography; employing concentrated solutions of quinia mixed with chloride of ammonium in troughs to intercept the incident light from any object anterior to the camera, when it was found almost impossible to obtain any image upon the sensitive collodion plate, although the intensity of the visible image received on the ground-glass screen did not suffer any apparent diminution.

4thly. By photographic printing; troughs containing these solutions obstructed the chemical rays very considerably, thus interfering with the production of a positive picture from the negative, much longer exposure being necessary to produce any chemical effect.

III. That certain reagents do not destroy fluorescence; others only mask its appearance by their own color; while some destroy it by neutralizing the excess of acid; others do so by producing salts which are themselves non-fluorescent media. While a third class destroy it by really modifying the alkaloid itself.

IV. That as so many reagents of common occurrence interfere with the manifestation of fluorescence, and as it is also a property common to all the Cinchona alkaloids herein described, its appearance becomes no longer of any value as a test for quinia.

V. Brandes' chlorine and ammonia test will discover 1 grain of either quinia or quinidin in 1 gallon of water, but shows no difference between these alkaloids, except in very concentrated solutions, when there is a precipitate with quinidin, but not with quinia.

Quinicin is also influenced by this test, but less extensively.

VI. Dr. Vogel's first modification of this test is of no apparent value; but by also employing ammonia, the author has found that it will indicate both quinia and quinidin, detecting readily 1 grain of either in a pint, and showing slight evidence with 1 grain in 10,000 grains of water.

There is scarcely any reaction with quinicin.

VII. Dr. Vogel's other modifications of Brandes' test are unimportant, with the exception of the fourth, viz., excess of chlorine, and very little ammonia. This detects 1 grain in about 2,000 grains of fluid very readily, if excess of acid be avoided at first. The test, however, is equally indicative of quinidin; it gives scarcely any perceptible reaction with quinicin.

mate of potassa, glacial phosphoric acid, and sulphuric acid. The nature of the red substance obtained is, as might be expected, very complicated. The red oleaginous substance is always accompanied by an acid, watery liquid, and has a peculiar aromatic, empyreumatic odor, like that of leucoline and that of the Cinchona bark combined. When this substance is exposed to the air it becomes brownish-red; its taste is bitter, burning, and like that of pepper; it is lighter than water, to which it communicates a slight taste and smell, without appearing to dissolve; it is soluble in alcohol, and water precipitates from its alcoholic solution, a soft, dark-colored resin.

For the accurate examination of the Cinchona barks the following tests, by Dr. F. L. Winckler, are, probably, the best. He observes:

"Of all long-known drugs none have in recent times so much engaged the attention of chemists as Cinchona bark—the discovery of the various

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VIII. Pelletier's chlorine-gas test succeeds very well with the free alkaloids, but does not show any indication with their salts. It is equally capable of detecting quinidin, and gives the same phenomena.

IX. Marchand's test is not a delicate reaction.

X. All the foregoing tests, although specially proposed for the discovery of quinia, possess equal powers and show the same appearances with quinidin. But they have no reaction on Cinchonia, cinchonidin, or cinchonicin.

XI. Van Heijningen's test by oxalate of ammonia, produces, after some hours, a crystalline oxalate of quinia, when using a fluid containing only 1 grain of alkaloid in 800 grains of water, and very readily detects immediately 1 part in 350. It does not precipitate quinidin or cinchonidin, but it produces a white precipitate in concentrated solutions of Cinchonia.

XII. De Vry's test for quinidin by hydriodic acid, or iodide of potassium in neutral solutions, produces a well-marked crystalline precipitate as a colorless salt, when one part of the alkaloid is present in 1,000 of the fluid; the crystals, being short hemihedral prisms, are readily recognized; the neutral hydriodates of cinchonidin are colorless, silky, prismatic needles, and much more soluble. If to a solution of the sulphate of quinidin in dilute spirit ($\frac{1}{3}$) we add hydriodic acid, and expose to the action of light during some days, there is formed the red iodosulphate of the author.

The neutral hydriodate of quinia appears as lemon-yellow prisms. The neutral hydriodate of Cinchonia appears as long, thick, colorless prisms, and is very soluble.

XIII. Liebig's ether test dissolves quinia, quinicin, and cinchonicin, and therefore does not discriminate between them, as they are all uncrystallizable. It dissolves also a portion of the quinidin and cinchonidin. Should the proportions of these alkaloids not exceed the solvent powers of the ether employed, they will not be indicated by this test. When crystallization occurs, the rhombic prisms indicate cinchonidin; the long slender aciculæ, quinidin; while an amorphous powder is demonstrative of Cinchonia. Ether also extracts cinchonidin from Cinchonia; but its sparing solubility in ether necessitates the employment of warmth, and a large quantity of ether.

XIV. Leers' combination of the ether test with that of Brandes can readily detect small portions of quinia, quinidin, or quinicin in Cinchonia or cinchonidin, especially when used in the manner as modified by the author."—*Proceedings of the Royal Society.*

alkaloids contained in it having afforded a safe standard for the determination of its goodness.

This circumstance has been accompanied by a large number of results, which are of great importance in medical practice. It has removed the uncertainty of the notion of genuine and spurious barks, and made it possible to distinguish the former from the latter, and to determine their real value.

The excellent work of Von Bergen forms the foundation of our knowledge of the Cinchona barks. Its theoretical part contains every thing that could be obtained at the time of its appearance; but Von Bergen's account of the mercantile relations of this drug is of greater value, because nothing certain was known on this point before, and because, for the medicinal use of barks an accurate knowledge of the material imported is certainly of greater importance than the origin of the barks. Notwithstanding all our present information, a long time must elapse before we can accurately arrange the barks imported into Europe, because in consequence of the greatly increased consumption, for the purpose of obtaining the alkaloids, new sources are rendered necessary, and new districts in the native country are explored, by which, doubtless, new species of Cinchona are discovered.

The correctness of this view is shown by the present occurrence of a considerable number of barks which were hitherto unknown; as, for example, the barks containing quinidin and paricin, and the numerous sorts of the so-called yellow barks; and it may without hesitation be asserted that these barks contain also a larger number of alkaloids than is known at present.

I have read with much interest Weddell's excellent work, from which Dr. Riegel some time since extracted (see Pharmaceutical Journal, vol. ix., p. 224,) the information which is of the most importance to the pharmaceutist. Although I am far from undervaluing the high merits of this distinguished traveler, the successor of Humboldt and Poppig, I am, notwithstanding, of opinion that too great importance must not be attached to his researches. I consider that his proposal to determine the goodness of barks by their anatomical structure has no greater value than as an application to botany generally, and to vegetable physiology in particular, for I have convinced myself by numerous and most carefully performed experiments that his assertion that the shortly fibrous barks contain the largest proportion of alkaloid can not be admitted, as its truth has been directly disproved. It is only applicable to Calisaya bark, and, even in that case, has many exceptions. Were this alone sufficient to raise doubts about the possibility of judging of the goodness of barks by their structure, there is also another circumstance to be taken into consideration. The anatomical structure of bark is, as is well known, uninterrupedly progressive during vegetation: each stage offers a new formation, the bark of the trunk appears very different from that of the larger branches, and that of these varies again in its structure from the bark of the smaller branches. Lastly, we ought to examine the barks as Weddell did, in their fresh condition, in order to be enabled to judge of their structure. These views of Weddell's, however interesting they may be in other respects, are, I am convinced, of a very subordinate value for medical practice. We must, therefore, still follow the chemico-analytical route, if we wish to establish a scientific and safe classification of the Cinchona barks.

Dr. Riegel was no doubt of the same opinion, when he appended to his extract from Weddell's work a synopsis of all the known methods of determining the proportion of alkaloids; and I am much surprised how he, under these circumstances, could express some doubts whether my experiments perfectly agreed with Weddell's statements about the origin of the barks, which was scarcely possible. All my experiments refer only to commercial barks, by the names under which they occur in commerce, and I have described their physical characters. Weddell, on the other hand, had quite another object in view, namely, the origin of the barks; and he made no comparative chemical investigations of them. Nevertheless, he, like his predecessors, has left us in uncertainty about the origin of many commercial barks; for I can never persuade myself that Loxa bark and the woody Carthagena bark are derived from the same mother-plant, Cinchona Condaminea; and every one who knows and has chemically examined both barks, will perfectly agree with me.

We ought, therefore, while fully acknowledging Weddell's merits, not to overlook the difficulties of the subject. It would be unjust to expect that a traveler struggling with hardships of every kind should perform chemical experiments on the spot. This would be contrary to the purposes of so great an undertaking.

My object has hitherto been to arrange the commercial barks according to the specific proportion of alkaloid which they contain, as I have already done, in a small treatise.

There is indeed nothing that could materially obstruct such an arrangement, especially as by the discovery of the kinates, we are enabled easily to distinguish similar spurious barks from genuine ones, while every uncertainty may be removed by one single experiment. Discrepancies like that which Reigel has noticed with regard to the chemical constitution of Pitaya or Bicolorata bark, depend on the mistaking of one bark for another, which frequently arises from the employment of erroneous names. The bark which Peretti examined as Cinchona bicolorata, can not be identical with that whose alkaloid richness Muratori determined. According to Peretti, and his experiments agree with mine, the bark which he examined contained a peculiar, amorphous, uncrystallizable alkaloid (Peretti's *pittayin*), and is *decidedly no Cinchona.*

As regards the testing of Cinchona barks for the alkaloids, no notice has hitherto been taken of the proportion of kinovic acid, but as the very bitter taste of the spurious Cinchona barks depend exclusively on this acid, and in some of the genuine barks kinovic acid is found, a mistake may be easily made by the taste. I have, for several years past, devised and employed a method by which not only the proportion of the alkaloid, but also that of the kinovic acid may be quantitatively and qualitatively determined, while at the same time the proportion of both kinic acid and oxidized tannin (Cinchona red) is indicated. So that all those constituents of the bark, which are of importance for medical practice, are determined.

The barks tested by this method, yield, when employed for the manufacture of the alkaloid on a large scale, exactly the same quantity which they yield by the experiment, generally one-eighth to one-quarter per cent. more, the loss in working with large quantities being naturally less in proportion, and this indeed is the best proof of the efficiency of this method.

In the qualitative examination of Cinchona barks, a number of tests have hitherto been employed, which have not only aided this examination, but have rendered it much more difficult.

The efficacy of the bark depends, as is well known, chiefly on the proportion of alkaloid, and of that of pure and oxidized Cinchona-tannin. Of the kinovic acid, we only know that it does not act as a febrifuge. The medicinal virtues of kinic acid or kinate of lime have not yet been determined. We must, therefore, confine ourselves to the application of those tests by means of which these compounds can be detected in an infusion of bark, and their quantitative proportion at least approximatively determined. These are, as has been before stated in my monograph on genuine barks, as follows:

1. *Tannin*, for detecting the alkaloids. The more abundant the precipitate produced by this reagent in the aqueous filtered infusion, the more alkaloid do the barks contain.

2. *Chloride of iron* determines the proportion of oxidized tannin by the more or less intensely dark-gray coloration, which speedily becomes brown, and by the subsequent more or less abundant pulverulent precipitate of a dark, dirty, brownish-green color.

3. *Gelatine* (*solution of isinglass*), like chloride of iron, occasions the oxidized tannin to be precipitated. In the liquid filtered from the magma, the proportion of non-oxidized Cinchona-tannin may be determined by iodic acid. The latter oxidizes the tannin, and causes the precipitation of a yellowish-brown powder; the mixture soon smells of iodine. The quantities of these two precipitates show the proportion of oxidized and of pure Cinchona-tannin.

4. *Sulphate of copper* is perfectly indifferent to the aqueous infusion of bark, which contains no kinovic acid, but indicates the smallest proportion of this acid by a dirtyish-green coloration of the mixture, which is speedily followed by a similarly colored fine powder, which is easily separated by the filter, and, after being washed, is distinctly recognized by its very bitter and metallic taste, as kinovate of copper. The more abundant this

precipitate, the greater is the proportion of kinovic acid. All other reagents hitherto employed can be absolutely dispensed with.

Of all the hitherto known methods for the quantitative determination of the alkaloids, I prefer the following: If the quantity of bark at command be large, it is necessary, in the first place, to ascertain whether it consist of one or of several sorts. An experienced eye can readily determine this. The several sorts should be separated, and, for experiment, not too small a quantity selected from the entire mass of the coated and uncoated of the coarser and finer barks, taking of each sort according to the various dimensions in which it is contained in the whole mass, about an equal weight. These pieces are to be finely powdered and the residue mixed with the powder. Of this powder 500 grs. or 1,000 grs. are to be completely exhausted by digestion in the water-bath, with the necessary quantity of alcohol of 80 per cent. (I use six ounces of alcohol for 1,000 grs. bark); the cold tincture is to be strained through a thin but close piece of linen, the residue washed with alcohol and again digested, and completely exhausted with half the weight of the first employed quantity of alcohol. The residue which is now obtained is to be once more exhausted by alcohol, then dried and preserved. (There is no occasion to spare the alcohol in this process, as the greater portion of it is recovered.) The united alcoholic tinctures are to be filtered and digested at the common temperature, with a mixture of equal parts by weight of recently prepared slacked lime and of crude well-burnt animal charcoal, of which in general half the weight of the employed bark is required. The mixture is to be frequently shaken, and the digestion continued until the supernatant liquid becomes perfectly decolorized. In the case of most of the genuine barks, this takes place in a short time; but the alcoholic tinctures of the spurious barks, which contain kinovic acid, as well as those which contain paricin, are very imperfectly decolorized by this process, a circumstance which serves to distinguish the paricin barks and spurious barks from the genuine ones.

The decolorized liquid is now to be removed from the residue, and the latter repeatedly shaken with small quantities of alcohol, washed on the filter with spirit of wine and dried. From the mixed filtered alcoholic tinctures the greater portion of the alcohol can be recovered by distillation in the water-bath. Beindorff's distillatory apparatus with Liebig's refrigerator is well adapted for this purpose—a similar and much cheaper apparatus can be constructed of tin. The whole quantity of alkaloid which was contained in the bark is now in the residue, and, if the bark contained kinovic acid, in combination with the latter, and a peculiar fatty substance. Small proportions of oxidized tannin are frequently mechanically mixed with it. In order to purify the alkaloid of the latter, and to remove the kinovic acid and fatty matter, the residue is to be placed in a small evaporating basin, the distilling vessel is to be washed with a small quantity of water, slightly acidulated with sulphuric acid, and the solution added to the residue. A small excess of diluted sulphuric acid is to be dropped into this mixture, which is to be heated, and when it again becomes cold is to be filtered, and by this means the precipitated kinovic acid and fatty matter are removed and washed with distilled water. From the filtered acid solution the alkaloid is to be thrown down by a slight excess of ammonia; and the mixture evaporated by a slight heat to dryness. The sulphate of ammonia contained in the cold residue is to be removed by a small quantity of very cold water, and the residual alkaloid dried and weighed in this impure state; for the perfect purification of small quantities is attended with too great a loss to admit of the exact determination of the quantity of alkaloid contained in small quantities of bark. After having thus determined the weight of the alkaloid the further examination of it is proceeded with, the Cinchonia and quinia are separated by ether, etc.

In order to determine the proportion of kinovic acid, dilute solution of ammonia is to be added to the yellowish, glutinous matter which adheres to the filter, and which is, for the most part, greasy to the touch. This takes up the kinovic acid but not the fat. The solution is to be filtered, and to it a slight excess of muriatic acid added to precipitate the kinovic acid, which is then to be collected on a filter. The well washed glutinous precipitate is to be removed while moist from the filter, and dried upon a watch-glass or porcelain capsule, and the weight of the thus obtained kinovic acid marked down. This, however, is only the larger portion of the quantity of kinovic acid actually obtained from the bark. A smaller portion of it is still contained, combined with lime, in the lime-residue which has been digested with the alcoholic tincture of bark. This kinovate of lime is very difficultly soluble in spirit of wine.

In order to obtain this smaller portion, the lime-residue, exhausted by alcohol, is to be dried and powdered, and then digested with cold distilled water. From the filtered liquid, which is almost as clear as water, the white and nearly pure kinovic acid is thrown down by a very slight excess of muriatic acid. It is then to be weighed, and the sum added to that before obtained. By the direct treatment of powdered bark with milk of lime, the whole quantity of kinovic acid can be extracted from the bark. Also for the quantitative determination of the acid it is advisable to weigh it in the imperfectly pure condition, the loss accompanying the purification being very considerable.

If the qualitative examination of the bark has shown that this substance contains none or only a small proportion of alkaloid, but a large quantity of kinovic acid, or the latter only, the bark is more appropriately first treated with diluted milk of lime, and the kinovic acid precipitated by muriatic acid, by which method the testing of the residue for a possibly slight proportion of alkaloid is considerably facilitated. The dry residue of lime is then exhausted by alcohol, like the powdered bark, etc. In this manner I obtained from sixteen ounces of bark, containing kinovic acid, one grain of Cinchonia, besides a large quantity of kinovic acid. The last more important constituent of the bark, the kinic acid, is now easily obtained by exhausting the residue of the bark, which has been treated by alcohol, with cold distilled water, evaporating the filtered liquid and distilling it in a not too concentrated state with peroxide of manganese and moderately strong sulphuric acid; the least proportion of kinic acid in the liquid is soon indicated by the development and evolution of kinone, which takes place during this process; and the smallest quantity of the kinone, which is not distinctly perceptible by the smell, may be soon detected by the dark color, which the distillate assumes upon the addition of a few drops of a solution of ammonia.

This method of testing barks is distinguished from others by its great simplicity, by the correctness of the results, and by the possibility of detecting and quantitatively determining in one succession, and with the same material, all the more important constituents of the bark; I consider it as the best method known, not because it originates with me, but because it is adapted for the present stage of our knowledge of the chemical composition of Cinchona barks, and *is practical.* It may be objected that it is rather troublesome, but this ought not to be of any consideration if we can be but sure of a correct result.

In conclusion, I must observe, that my method, though chiefly adapted for testing genuine barks, can be advantageously applied for examining new and apparently spurious barks. The occurring phenomena will then safely guide the experienced operator. With the barks containing paricin, the separation of the alkaloid is made very difficult, by its forming with the Cinchona-red contained in the bark, compounds soluble in acids and alkalies, which can be decomposed only with great difficulty. I refer in this respect to my last treatise on the Production and Chemical Condition of Paricin, in Buchner's *Repertorium.*"

On the Quantity of Alkaloids contained in many Barks.—Buchner and Rabourdin, as well as Dr. E. Riegel have tested many Cinchona barks for the purpose of determining their proportion of alkaloid; and the following are the results obtained by the latter physician using the processes of the two previous chemists; he gives a classification of the barks, similar to that already described on page 241, and then proceeds with his results, thus:

1. One ounce of Calisaya bark, best quality, yielded 18.25 grains quinia, or 3.8 per cent.—*Rabourdin.*

One ounce of the same bark, the product having been purified, 15.5 grains quinia, or 3.22 per cent.—*Buchner.*

2. One ounce Calisaya bark, Wed. var. β Josephiana, 15.75 grains, or 3.29 per cent.—*Rabourdin.*

One ounce of the same bark, 13.25 grains, or 2.76 per cent.—*Buchner.*

3. One ounce Calisaya bark, middling quality, 12 grains, or 2.5 per cent.—*Rabourdin.*

One ounce Calisaya bark, 10.5 grains, or 2.18 per cent.—*Buchner.*

4. One ounce false Calisaya, from C. pubescens, Wed., 8.2 grains, or 1.7 per cent.—*Rabourdin.*

5. One ounce fibrous yellow bark yielded 10 grains alkaloid, or 2.08 per cent.—*Rabourdin;* 9.5 grains alkaloid, or 1.97 per cent.—*Buchner.*

By treating the alkaloid with ether, almost half of it was dissolved, and the residue, obtained after evaporating this solution, possessed the properties of the quinia, hereafter to be described, and that portion which had remained undissolved, those of Cinchonia. Whether the quinia contained Cinchotin, could not be determined. Buchner gives it as his opinion, that the Carthagena bark contains no quinia, but Cinchotin and Cinchonia.

6. One ounce of hard yellow bark (flava dura), yielded 11.5 grains, or 2.39 per cent. alkaloid after *Rabourdin;* 11.2 grains, or 2.3 per cent. after *Buchner.* On the application of ether about 5 grains were dissolved of 11.5 grains, showing a proportion of 1.04 per cent. quinia, and 1.35 per cent. Cinchonia, which quantities and proportions agree pretty nearly with the experiments of Geiger, Röttger, Bonnet, Scharlau, and others.

7. One ounce red bark, best quality, yielded 20 grains, or 4.16 per cent. after *Rabourdin;* 18.75 grains, or 3.9 per cent. after *Buchner.* Of these 20 grains, 12.75 grains were dissolved by ether, which corresponds with 2.65 per cent. quinia, and 1.51 per cent Cinchonia.

8. One ounce of red bark, in large, broad flat pieces, contained 18.5 grains, or 3.85 per cent.—*Rabourdin.*

The results hitherto obtained with regard to this bark differ considerably from one another, and especially in the relative proportions of quinia and Cinchonia. Michaelis found in 100 parts 0.42 Cinchonia and 0.83 quinia; Von Santen, on the other hand, at an average, a much larger proportion of Cinchonia than of quinia, while Pelletier and Caventou obtained from quilled bark 0.8 Cinchonia and 1.7 quinia. According to the table of the proportions of the alkaloid, quoted in Dulk's *Commentary on the Prussian Pharmacopœia,* one pound of red bark (thick middling heavy quills) contains 197 grains alkaloid; 184 grains Cinchonia, and 9 grains sulphate of quinia: one pound of fine quills of fresh appearance, 147 grains alkaloid; 70 grains Cinchonia, and 77 grains sulphate of quinia: one pound of large, broad and flat pieces of a fresh brown-red appearance, 105 grains alkaloid; 90 grains Cinchonia, and 15 grains sulphate of quinia. In more than thirty experiments performed by Röttger, Bonnet, and others, the proportion of quinia (calculated as sulphate of quinia) has always proved to be larger than that of Cinchonia. Scharlau obtained after Stratingh's method, in an average of three experiments, 1.34 per cent. quinia and 1.11 per cent. Cinchonia.

After Tilloy	0.96	per cent.	quinia and	0.6	per cent.	Cinchonia.
" Staltze	1.45	"	"	0.06	"	"
" Veltmann	1.40	"	"	1.00	"	"

9. One ounce false red bark (origin?) yielded, after *Rabourdin*, six grains, or 1.25 per cent. alkaloid, of which 2.5 grains dissolved in ether, equal 0.52 per cent. quinia, 0.73 per cent. Cinchonia.

10. One ounce Cinch. *regio rubiginosa* (origin?) contained, after *Rabourdin*, 14.75 Cinchonia, with a trace of quinia, or 2.87 per cent.; Franck found in 100 lbs. of the bark 50 ounces, or 3.12 per ct. Cinchonia, with a trace of quinia. The Ch. rubiginosa bearing great resemblance to Ch. flava fibrosa (it was first introduced into commerce under the false name of *Cusco bark*, from which it differs, however, strikingly), it may be supposed that this bark originates from some species which is closely related to Cinchona pubescens, perhaps even from that very same.

11. One ounce Huanuco bark in heavy middling quills, contained, after *Rabourdin*, 11.7 grains pure Cinchonia; after *Buchner* 11.75 grains, equal to 2.4 per cent. Winckler obtained 2.473 per cent.; Buchner only 1.875 per cent. of colored alkaloid; and Röttger, after the improved method of Veltmann, 2.8 per cent.

12. One ounce Huanuco bark in thick quills yielded 9 grains, or 1.87 per cent. Cinchonia.—*Rabourdin.*

13. From one ounce of Loxa bark, the so-called finest crown-bark, 4.5 grains, or 0.94 per cent. alkaloid were obtained after *Rabourdin*, of which 2.5 grains dissolved in ether, showing the properties of quinia, while the residue manifested itself as Cinchonia.

14. One ounce of ordinary Loxa bark, in beautiful middling quills, contained 3.5 grains, or 0.73 per cent. alkaloid, consisting for the greatest part of Cinchonia.—*Rabourdin.*

15. One ounce Ch. Huamalies in fine and middling fine quills and somewhat flat pieces, contained 7 grains, or 1.46 per cent. Cinchonia.—*Rabourdin;* 6.5 gr.—*Buchner.*

16. One ounce Ch. Huamalies in thick warty quills and flat pieces, yielded, after Rabourdin, 4.25 grains, or 0.93 per cent. Cinchonia. Winckler found in the best Huamalies 1.15 per cent. alkaloid, quinia and Cinchonia. Buchner discovered only Cinchonia in this bark. Hornemann extracted from 1 lb. Crown Huamalies 132 grains Cinchonia and 4 grains quinia; from the so-called gray Huamalies 128 grains Cinchonia and hardly any quinia. The average of both experiments gives 1.7 per cent. alkaloid.

17. One ounce of Pale Ash bark (Jaen China) yielded, after *Rabourdin*, 2.5 grains, or 0.61 per cent. alkaloid, containing only traces of quinia. From the dark Jaen China, or pseudo Loxa, Winckler extracted 2.844 grains Cinchonia and 0.711 grains quinia, together 3.5 grains, or 0.045 per cent. alkaloid; afterward he described a bark, Jaen Fusca (synonym China rubra de Janeiro?) which is said to contain neither quinia nor Cinchonia, nor kinovic acid, but the Cinchovatin of Manzini. According to the most recent investigations of Winckler (*Neus Repert. f. d. Pharm.*, Bd. i., Hft. i.) the Pale Jaen bark does not contain quinia, as has been

hitherto supposed; but Paracin, which exists also in the dark Jaen or Para bark, combined with a substance resembling red Cinchonic. The latter bark contains also kinate of lime (of the presence of which the author has convinced himself), but no kinovic acid. For the preparation of Paricin, Winckler recommends the application of muriatic acid to the alcoholic extract and precipitating with carbonate of soda. The Paracin has much resemblance to Bebeerine. The author doubts whether these statements of Winckler agree with the data of Weddell respecting the origin of the barks.

18. One ounce of Cusco bark yielded, after *Rabourdin*, 5.25 grains alkaloid, which in a pure state has the greatest resemblance to Paracin.

19. China nova surinamensis treated after the same method yielded no alkaloid, but kinic acid, kinovic acid, and cincho-tannic acid.

20. One ounce Pitaya, Tecamez, or Acatemez bark contained 8 grains alkaloid, after *Rabourdin*, for the greatest part insoluble in ether, and possessing the properties of Cinchonia. Peretti discovered in this bark (recommended by Brera as Ch. bicolorata) a peculiar vegetable basic salt called *Pitoyin;* Muratori, however, obtained from 12 ounces 17 grains quinia, 80 grains Cinchonia, 18 grains of a peculiar substance, 3 drachms 24 grains tannin, 9 drachms red Cinchonic, soluble in alcohol, 36 grains soluble in acids, and 24 drachms soluble in alkalies, 1 drachm 8 grains kinate of lime and free kinic acid, 7 drachms of gum, and 6 ounces 1 drachm, 21 grains ligneous fibers. The origin of this bark is yet unknown; to judge from the presence of quinia and Cinchonia it may be derived, according to Weddell's views, from a species of Cinchona, although some suppose it to come from Exostemma floribundum. Equally unknown is the origin of the bark of Maracaibo; Winckler found in it kinovate of quinidin, a peculiar yellow coloring matter, which does not change the chloride of iron, a large proportion of kinate of lime, very little Cincho-tannic, and no red Cinchonic."*

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* M. M. Delondre and Bouchardat, who have devoted some time to the investigation of the Cinchona barks, and the quantity of alkaloids contained in them, have ascertained that the leaves and fruit of the Cinchona trees do not contain the alkaloids found in the bark of the trunk and roots, and also, that the bark of the trunk and branches contain a greater proportion of them than the bark of the root. From the *quilled C. Calisaya* bark, they obtained from 15 to 20 grammes of the sulphate of quinia, and 8 or 10 grammes of sulphate of Cinchonia, for the kilogramme. From the *flat C. Calisaya* bark, they obtained from 30 to 32 grammes of sulphate of quinia, and 6 or 8 grammes of sulphate of Cinchonia, for the kilogramme. From the *C. Carabaya*, 15 to 18 grammes of sulphate of quinia, and 4 or 5 grammes of sulphate of Cinchonia, for the kilogramme.

The *yellow bark* of Mutis yielded 12 or 14 grammes sulphate of quinia, and 5 or 6 grammes sulphate of Cinchonia, for the kilogramme; the *red bark* 12 or 14 grammes sulphate of quinia, and 6 or 7 grammes sulphate of Cinchonia; and the *red Cinchona of Cusco*, 4 grammes sulphate of quinia and 12 grammes sulphate of Cinchonia. In operating separately upon thousands of kilogrammes, the yield for each kind of bark scarcely varied at all. The sulphate of quinia obtained from the red bark of Mutis, was furnished most readily, and is of a peculiar form, being soluble in sixty parts of ether and sixty parts of ammonia, while that obtained from Calisaya Carabaya and orange-yellow barks is soluble in eight parts of ether and two parts of ammonia. The crystals of quinidin in most instances were not formed until several days had elapsed.

The following table is taken from Pereira:

Comparative Table of some Distinguishing Properties of Quina, Quinidina, and Cinchonia.

		QUINA.	QUINIDINA.	CINCHONIA.
The anhydrous alkaloid is..........		Amorphous (the hydrate crystallizes with difficulty	Crystalline (crystallizes from the alcoholic solution)	Crystalline (readily crystallizes from the alcoholic solution.
Taste		Very bitter	Bitter (less intensely so than quina)......	Bitterish, unpleasant (somewhat analogous to sulphate of magnesia).
Optical properties of a solution of the alkaloid	Fluorescency	Fluorescent	Fluorescent?...........	Not fluorescent.
	Rotary polarization.	Left-handed	Left-handed.	Right-handed.
Solubility of 1 part of alkaloid in	Cold water..............	In 400 parts	In 2,580 parts.........	Almost insoluble.
	Boiling water..........	In 250 parts	In 1,858 parts.........	In 2,500 parts.
	Cold rectified spirit	In 2 parts of boiling spirit; the solution does not dep'sit anything when cold.	In 12 parts of cold spirit; the alkaloid is much more soluble in boiling spirit.	In 33 parts.
	Boiling rectified spirit			Insoluble.
	Cold ether...............	In 60 parts.......		
A solution of the alkaloid (*e. g.* of the sulphate in water) treated first with chlorine-water, then with ammonia.............		Becomes emerald-green.	Remains unchanged, or yields a white precipitate.	Becomes pinkish, and yields a white precipitate.
Solubility of 1 part of the sulphate of the alkaloid in.........	Cold water..............	In 740 parts.......	In 130 parts...........	In 54 parts.
	Boiling water..........	In 30 parts.......	In 10 parts.............	
	Cold rectified spirit.	In 60 parts.......	Easily soluble.........	In 6½ parts [in 11½ parts of anhydrous alcohol].
	Boiling rectified spirit	[Much more sol. than in cold spir.	Very easily soluble...	
	Cold ether..............	Slightly soluble.	Almost insoluble.....	Insoluble.

Properties and Uses.—Cinchona bark is tonic, antiperiodic, slightly astringent, and topically antiseptic. When swallowed, a sensation of warmth is experienced at the stomach, which gradually spreads over the whole trunk; occasionally, it produces an unpleasant excitement of the stomach and bowels, with retching and emesis, more especially if the former be very sensitive. In a little while after its administration, the general system becomes more or less influenced, the pulse being fuller and more rapid, and a gentle stimulus imparted to the various organs of the body. With many persons, it occasions symptoms which have been termed *cinchonism*, and which, when produced, are evidences that the remedy is exerting a favorable influence; but these symptoms should never be pushed too far. They are—throbbing headache, and giddiness, of greater or less severity, tinnitus aurium, and imperfect hearing. Cinchona is valuable in functional derangement of the stomach, improving digestion, and invigorating the nervous and muscular systems in diseases of general debility, and in convalescence from exhausting diseases. As a tonic, it will be found useful in all febrile, eruptive, and inflammatory diseases, which manifest a degree of periodicity, in which it should be administered during the remissions; it is also valuable during the low and typhoid conditions of these diseases, and also in those cases, where, from an excessive and continued secretion of pus, the system becomes very much enfeebled and prostrated, in which it supports the powers of the constitution until all abnormal action is removed. It is likewise of much benefit in all chronic affections attended with periodicity, great feebleness, or nocturnal perspiration. When it occasions vomiting, its use should be suspended for a time. Its employment is contra-indicated in acute inflammation, inflammatory fever, plethora, active hemorrhages, and in all nervous or vascular irritations.

Cinchona bark, however, exhibits its most important therapeutical powers, as an antiperiodic, and in the consequent influence it exerts in almost invariably curing remittent and intermittent fevers, and the generality of diseases which are accompanied by symptoms of marked periodicity, as neuralgia, hemicrania, epilepsy, diarrhea and dysentery when epidemic, etc. Its use should in most cases be preceded by a mild laxative, after the action of which the powder may be given in doses of from ten to sixty grains, and repeated according to circumstances, every one, two, or four hours, until one or two ounces have been taken during the periods of intermission, and continue thus until a cure is effected, or the remedy is found insufficient for the cure of the disease. In the use of the barks, to obtain their antiperiodic influence, the red and yellow are considered superior to the pale, and of which the red is preferred. As a tonic, the pale bark is generally preferred, being less obnoxious to the stomach and intestines. Quinia, or its salts, especially the sulphate, is usually employed as a tonic and antiperiodic in place of the bark itself, but there have been many instances in which the bark in powder has succeeded in effecting a cure, when its alkaloidal salts failed; the cause of this is not well understood. In such cases, when the powder, from its bulk, or otherwise, offends the stomach, the infusion, decoction, tincture, or extract may be administered. Sometimes bark or its preparations, occasion purging, which may be obviated by small portions of opium or laudanum.

Externally, a poultice of the bark has been found an excellent application to felons, fetid and gangrenous ulcers, etc.; also as an injection with opium, when the stomach rejects it; the powdered bark, placed between muslin, and held in its place by sewing in cross-bars, the same as in quilting, making medicated jackets, to be worn in contact with the body, has been of utility in obstinate intermittents. Dose of Cinchona as an antiperiodic, from half a drachm to a drachm; as a tonic, from ten to sixty grains; of the infusion or decoction, two fluidounces, to be repeated two or three times a day; of the extract from five to thirty grains.

Quinia, Cinchonia, and Quinidina appear to possess similar medicinal properties, in similar doses; their salts (as the sulphate), appear to be best adapted for medical use, principally on account of their ready solubility. Dose of either, from one to four grains, three times a day, or oftener, if required; in severe intermittents as high as ten grains may be administered for a dose.

Off. Prep.—Cinchonia; Decoctum Cinchonæ; Extractum Cinchonæ; Extractum Cinchonæ Fluidum; Infusum Cinchonæ; Quiniæ Sulphas; Tinctura Cinchonæ; Vinum Cinchonæ Compositum.

CINNAMOMUM ZEYLANICUM. (*Laurus Cinnamomum.*)

Cinnamon.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

THE BARK.

Description.—This tree has a rough bark, and grows from fifteen to twenty-five feet, or more, high, having a trunk from a foot to a foot and a half in diameter. The *branches* are somewhat four-cornered, smooth; *leaves* ovate, or ovate-oblong, from six to nine inches long, two to three inches broad, tapering into an obtuse point, triple-nerved, reticulated on the under side, smooth, the uppermost the smallest, opposite, coriaceous. The *flowers* are small, hoary, and silky, white; *segments* oblong, deciduous in the middle; *panicles* terminal and axillary, stalked.—*L.*—*Ed.*—*P.*

Cinnamomum Aromaticum is a tree similar to the above, with angular branches, and petioles covered with broken downiness. The *leaves* also resemble the above, but differ in being oblong and acute, with curved veinlets on the underside, and in having a very fine down on their lower surface. The panicles are narrow, silky.

History.—Cinnamomum Zeylanicum is a native of Ceylon, Sumatra, Borneo, etc., and is cultivated in many parts of both the new and old world. The bark ~~of the root~~ is the officinal part; it has the odor peculiar to Cinnamon, and an agreeable, warm, aromatic flavor, with a mild degree of sweetness. The leaves are similar in taste and odor, but less powerful, and contain a volatile oil, which may be procured by distillation. The odor of the flowers is to most people disagreeable, like newly-sawn bones.—*Ed.* The tree throws out no fragrance beyond its immediate sphere. The bark is the Cinnamon of commerce. It is usually collected from trees about nine years old. The peeling of the shoots and branches commences in May, and continues until the latter part of October. The bark is freed from its epidermis, and then dried, first in the shade, and afterward under exposure to the sun; it curls in drying into quills, which are subsequently placed within each other, as they will admit. The best bark comes from Ceylon, which is in the form of rolls about half an inch in diameter, and thirty to forty inches long, and composed of many quills within each other. They have a light-yellow color, are thin, smooth, shining, a little thicker than cartridge-paper, and break readily with a splintery fracture, being easily pulverizable. They possess a rich, pure, peculiar odor, and a warm, spicy, sweetish and agreeable taste, and yield their virtues to water, but more readily to alcohol or spirit. A small amount of volatile oil may be procured from it by distillation. The thick, dark-brown, and feebly-flavored bark is of an inferior quality. Cinnamon, according to Vauquelin, contains volatile oil, tannic acid, coloring matter, resin, an acid (cinnamic), and ligneous fiber; starch has also been found in it. The tannic acid is of the nature of catechu-tannic acid, as it gives a dark-green precipitate with the salts of iron.

The C. *Aromaticum* is a native of China, and furnishes the cassia of this country, which is, in fact, a mixture of a variety of different qualities of Cinnamon. It is generally met with in cylindrical rolls or quills of various sizes, from two to twelve lines in diameter, or in semi-tubular segments, twelve or eighteen inches long, with the external layer much thicker than that of Cinnamon ; externally more of a dark-red, traversed with thicker and more shining, straight or serpentine veins ; more fibrous and paler in fracture ; internal layer coarsely fibrous ; heavier and more compact, with an odor similar to that of Cinnamon, but not so strong or agreeable, and a corresponding taste, more acrid, burning and lasting, at the same time mucilaginous. It is used in tinctures instead of Cinnamon, and is the kind usually sold as Cinnamon. There are several other species of Cinnamon, as the C. *Nitidum*, C. *Tamala*, C. *Loureirii*, C. *Culilawan*, etc., but they are not recognized as officinal.

Cinnamon is often adulterated with the poorer sorts, and likewise with the bark after having been deprived of its oil. These adulterations must be detected by the taste and odor of the article.

Properties and Uses.—Stimulant tonic, stomachic, carminative, and astringent; also reputed emmenagogue, and capable of diminishing the secretion of milk. The tincture of the bark is useful in uterine hemorrhage and menorrhagia, given in drachm doses in sweetened water, and repeated every five, ten, or twenty minutes, or as may be required. Cinnamon is generally used to correct the effects, or improve the flavor of other drugs, and is one of the best additions to cinchona bark for correcting the nausea or vomiting sometimes occasioned by that drug. Internally, it is very useful in diarrhea, colic and cramp of the stomach, flatulency, and to allay nausea and vomiting. Dose of the powder, from five to twenty grains ; of the tincture, from ten to sixty drops. (*See Oil of Cinnamon.*)

Off. Prep.—Acidum Sulphuricum Aromaticum; Aqua Cinnamomi; Oleum Cinnamomi; Tinctura Cinnamomi; Tinctura Cardamomi Composita; Tinctura Catechu ; Tinctura Guaiaci Aromatica; Tinctura Olei Cinnamomum ; Vinum Cinchonæ Compositum.

CIRSIUM ARVENSE. (*Cnicus Arvensis.*)

Canada Thistle.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant, called in England *Cursed Thistle*, has a perennial, creeping, very long root, extremely tenacious of life, with a *stem* three or four feet in height, having a branching panicle at top. The *leaves* are alternate, oblong or lanceolate, sessile, smooth, or slightly woolly beneath, sinuate-pinnatifid, and prickly margined. *Heads* rather small and numerous, imperfectly diœcious ; *flowers*, rose-purple ; *involucre* round or ovate, with minute spines, scales close pressed, ovate-lanceolate.—*W.—G.*

History.—Canada Thistle grows in various sections of the United States, in cultivated fields and pastures, roadsides and waste places, flowering from June to August. It is an extremely troublesome plant to the farmer, requiring his utmost vigilance to extirpate it from his fields. The involucre is the only part of the plant that can be handled with safety. The root is the part employed, which yields its properties to water.

Properties and Uses.—Tonic and astringent. Used principally in diarrhea and dysentery, boiled with milk; some recommend the addition of dried codfish skin to the decoction. Also, used as a local application to some cutaneous diseases, ulcers and leucorrhea.

Off. Prep.—Decoctum Cirsium.

CISSAMPELOS PAREIRA.

Pareira Brava.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Diœcia Monadelphia.

THE ROOT.

Description.—Pareira Brava, also termed *Velvet-Leaf*, *Ice-Vine*, is a shrub, with a round, ligneous root, *stems* either smooth or with close pressed down, and climbing over trees. The *leaves* are large, nearly orbicular, peltate, aristate at the point, when full grown smooth above, underneath covered with silky pubescence, but not truly downy. *Flowers* diœcious, hispid, in racemes; *sepals* eight, the four inner united into a cup, with usually an entire margin; *peduncles* solitary or in pairs, branching from the base, as long as the petiole or longer, racemose-corymbose, with divaricating downy ramifications. *Racemes*, in the female plant, longer than the leaves, bearing the flowers in spiked fascicles. *Bracts* sessile, somewhat orbicular, scarcely mucronate. *Ovary* solitary, and surmounted with three stigmas. *Berries* scarlet, round, reniform, compressed, shriveled, thinned to the edge, all over hispid with long hairs.—*L.*

History.—This plant is a native of the West India islands, and the Spanish Main. The root is the officinal part. It is in cylindrical pieces or billets from half an inch to four or five inches in diameter, and from two or three inches to several feet long, and frequently split longitudinally; it is covered with a thin, dark-brown, very cohering epidermis, furrowed longitudinally with transverse rugæ, and in some pieces with tuberculations. The interior is woody, reddish-yellow, very foraminous, a transverse section presenting a number of concentric circles, and having no odor, but a sweetish, aromatic flavor succeeded by an intense and nauseating bitterness. It readily yields its bitterness and active properties to water or alcohol. According to Feneulle it contains a yellow bitter principle, a brown coloring principle, a soft resin, vegeto-animal matter, fecula, and several salts.—*P.—C.* Wiggers discovered the active principle to be an alkaloid, which is called *Cissampelin* or *Pelosin*, said to be a white powder, uncrystallizable, insoluble in water, soluble in alcohol, ether, and the acids, of an intensely bitter and sweetish taste, and forming soluble salts, of which the hydrochlorate crystallizes.

Properties and Uses.—Tonic, diuretic and aperient. Used in chronic inflammation of the bladder, and various disorders of the urinary organs. Also recommended in calculous affections, leucorrhea, dropsy, rheumatism and jaundice. Dose, of the infusion, from one to four fluidounces; of the extract, from ten to twenty grains.

The *Cissampelos Glaberrima*, growing in Brazil, a species of this plant, appears to possess similar properties.

Off. Prep.—Infusum Pareiræ.

CITRUS AURANTIUM.

Orange.

Nat. Ord.—Aurantiaceæ. *Sex. Syst.*—Polyadelphia Icosandria.

THE PEEL OR OUTER RIND.

Description.—Citrus Aurantium is a middle-sized evergreen tree, with an arborescent *stem*, covered with *bark* of a greenish-brown color, and having axillary spines on the branches. The *leaves* are alternate, ovate-oblong, acute, slightly serrulated or entire, shining green, with the stalk more or less winged. *Flowers* large, white, rendering the atmosphere around very fragrant, *calyx* urceolate, five-cleft; *petals* five, oblong; *stamens* twenty or even more; *filaments* compressed at the base, more or less united there, polyadelphous; *anthers* oblong, yellow. *Ovary* many-celled. *Fruit* roundish, golden-yellow or tawny, several celled, with a fleshy, juicy pulp; *seeds* white, several. *Cysts in the rind* convex.—*L.*

History.—The orange is a native of Asia, and is cultivated in the southern parts of Europe and America, and in the West Indies. Its varieties are numerous. The fruit likewise varies in its character, that of the C. Aurantium, the China Orange, being sweet, while that of the C. Vulgaris, or C. Bigaradio, the Seville Orange, is acid and slightly bitter. The leaves are studded with vesicles containing volatile oil, and have a bitter aromatic taste, and when rubbed between the fingers are very redolent. They yield by distillation an oil termed Essence de Petit Grain.

An infusion of them is sometimes employed as a gently stimulant diaphoretic. The flowers have a delicious fragrance, which is imparted to the surrounding atmosphere, but which is lost by drying; those of the bitter orange are considered the most delicate. They owe their aroma to an essential oil, which may be obtained by distillation; it is termed Oil of Neroli, and is much used in perfumery. An *Orange flower water* is prepared in Italy and France, which is quite pale, has a rich odor of the flowers, and a bitterish, aromatic taste; it is employed for the purposes of perfumery, although reputed to possess antispasmodic virtues. The peculiar fragrance of the flowers may be preserved for a long time by beating them into a pulp with one-fourth their weight of common salt. The juice of the Orange consists chiefly of sugar, mucilage and citric acid. The outer rind of the mature fruit is the officinal part, the inner being destitute of useful properties, and the two should always be separated from each other when drying the rind for medical purposes, as the spongy, inner rind is apt to occasion moldiness from its absorbing moisture from the air. Orange peel has a deep orange color, a grateful aroma, and a pleasantly bitter taste, the Seville variety being more bitter than any other. It contains a volatile oil in visible vesicles, and which is lost in drying, a saccharine principle, a bitter principle, and a ligneous fiber. The fresh rind, grated and expressed will yield the volatile oil, or it may be obtained by distilling the fresh rind with water. Water or alcohol takes up the sensible properties of the rind. The finest Orange Oil, which must not be confounded with the Oil of Neroli, is obtained from Portugal, and is prepared from the rind of the sweet Orange. It has a pale straw tint, and a rich fragrance of the rind. It is imported in tinned copper cans, and is much used in perfumery and for other purposes. On exposure it spoils rapidly, acquiring a turpentine odor. When about the size of a pea or cherry, the fruit is sold under the name of Orangettes or Curacoa Oranges; and the small ones are sometimes used to maintain the discharge from issues.

Properties and Uses.—Orange-peel is aromatic and slightly tonic, but is seldom used except to cover the taste of disagreeable medicines, or to lessen their tendency to nausea, and for these purposes, it is frequently added to bitter tinctures, infusions, etc., as quassia, Peruvian bark, etc.; though care should be taken not to subject it to long boiling, on account of its oil, which will thus be dissipated. As a tonic, the rind of the Seville Orange is preferred; its dose in substance is from thirty to sixty grains, three times a day. Large quantities of it have caused violent colic, convulsions, and even death. The juice of the Orange is not only a light refrigerant article of diet, but has a direct beneficial medicinal influence in several diseases; as in all fevers and exanthematous diseases, where acids are craved, and the patient's tongue is coated brown, black, or any intermediate color; in such cases its free use may be allowed with advantage; it is also useful as an antiscorbutic in scurvy. In administering the juice, the membranous portion should always be carefully rejected. The distilled water of the flowers are said to have proved beneficial in chorea, hysteria, epilepsy, and many other nervous disorders, in doses of one or two fluidounces.

Off. Prep.—Aqua Florum Aurantii.

CITRUS LIMONUM.

Lemon.

THE OUTER RIND AND JUICE.

CITRUS ACIDA.

Lime.

THE JUICE.

Nat. Ord.—Aurantiaceæ. *Sex. Syst.*—Polyadelphia Icosandria.

Description.—The Lemon-tree is an evergreen, about fifteen or twenty feet in height, with branches easily bent. The *leaves* are alternate, ovate-oblong, usually serrulated, smooth, glossy, dark green, with a winged petiole. The *flowers* are middle sized, white, purple externally, odoriferous. *Calyx* and *petals* similar to those of the orange. *Fruit* oblong-spheroid, sometimes almost globular, with a thin, pale-yellow rind, and a juicy, very acid pulp.—*L.*

The LIME, Citrus Acida (or *Citrus Limetta*, *Risso*), is a tree about eight feet in height, with a crooked trunk and diffuse branches with prickles. The *leaves* are ovate, obovate, oblong and serrate, being placed upon petioles not winged as in the orange and lemon. The *flowers* are small and white. *Stamens* thirty. *Fruit* ovate or roundish, pale-yellow, with a boss at the point, and about an inch and a half in diameter. *Cysts in the rind* concave. *Pulp* subacid, flat, slightly bitter.—*L.*

History.—These plants are of Asiatic origin, and cultivated in the West Indies, and some other tropical countries. The exterior rind of the Lemon, and the juice of its pulp, are officinal. The rind or Lemon-peel has a peculiar characteristic fragrance, an aromatic, bitterish taste, and imparts its properties to alcohol, wine, or water; and which depend upon a volatile oil contained in the minute vesicles with which it is filled, and which, when obtained by distillation with water, or by expression, forms the Oil of Lemon, of commerce. (*See Oil of Lemon.*)

Lemon-juice has an intense, grateful, acid taste, and a slight odor of the rind. One part of brandy or alcohol added to ten parts Lemon-juice, and then filtered to separate the mucilage, will preserve the acid for a long time; it will become slightly bitterish, but retains its strong acidity undiminished. The juice is frequently preserved in sugar, forming Lemon syrup, which, however, is very apt to spoil by age. Hence, citric acid in solution may be substituted for it, about four drachms of the acid being dissolved in eight fluidounces of water, which may be flavored with a few drops of oil or essence of Lemon. Lemon-juice contains 2.5 per cent. of solid matter, of which 1.77 is citric acid, and the rest chiefly mucilage and malic acid. The finest Lemons are those which are smoothest and thinnest in the skin.

The Lime is of considerably less size than the lemon, globular or oval, of a similar color, but frequently with a green or greenish tinge, its outer coat is not so thick and rough as that of the Lemon, and its internal pulp contains a large amount of juice of an excessively acid taste; this juice is chiefly used in the manufacture of citric acid. A variety of the Lime-tree, *C. Limetta,* furnishes a fruit from the rind of which is obtained the *Oil of Bergamot.*

Properties and Uses.—Lemon-peel is used in cookery and confectionary, and also in medicine to correct the taste and augment the power of bitter infusions and tinctures, its virtues being similar to that of the orange peel. The *juice* of Lemon is tonic, refrigerant and antiscorbutic, forming a refreshing and agreeable drink, possessing some medicinal influence, called *Lemonade,* and which, as with orange juice, may be used freely and advantageously in the febrile and inflammatory diseases, for which this last has been recommended. It may also be added to the nutritive drinks of the sick, as gum-water, gruel, barley-water, etc. Its power of preventing and arresting scurvy is unequaled by any other remedy, except a liberal supply of fresh vegetables of the cruciform family. In scurvy, an ounce or an ounce and a half of the juice per day, is a preventive dose, and when the disease manifests itself, four or six ounces per day will arrest it. Occasionally, but rarely, it fails to effect any benefit in this disease. Ships about to make long voyages, should be furnished with a bountiful supply of citric acid and oil of Lemon, or Lemon syrup with a small portion of brandy added. Scrotal pruritus, and uterine hemorrhage have been benefited by a local application of the juice.

Off. Prep.—Acidum Citricum; Liquor Potassæ Citratis; Syrupus Limonis.

CLEMATIS VIRGINIANA.

Virgin's Bower.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE BARK, LEAVES AND BLOSSOMS.

Description.—Clematis Virginiana is a perennial, climbing plant, with a stem from eight to fifteen feet or more in length, supporting itself on shrubs, fences and brushwood, by means of its long petioles. The *leaves* are deep-green ternate; *leaflets* ovate, cordate, acuminate, lobed, cut-dentate, and from two to three inches in length by one or two in breadth; *flowers* in clusters, paniculate, often diœcious; *panicles* large, axillary, dichotomous. *Sepals* four, white, spreading, oval-oblong, obtuse. *Stamens* from twenty-eight to thirty-six. *Fruit* furnished with long, plumose tails, appearing in large, downy tufts; *seeds* compressed.—*W.*

History.—The Clematis Virginiana is a native of the United States, and grows by river-banks, in hedges and thickets, from Canada to Georgia and the Mississippi. It flowers in July and August. The parts used are the bark, leaves, and blossoms, which yield their virtues to water or alcohol. The leaves should be gathered when they are fully grown, say in August, spread in the shade, and after drying thoroughly, should be closely pressed and packed in firm papers to exclude the air as much as possible, or what is better, should be placed into well closed glass jars, whose mouths are sealed, or covered with oiled silk, bladder, or other impervious material.

The *C. Viorna* or *Leather Flower*, which is more common in the Western States, and may be found growing in woods from Pennsylvania to the Mississippi, may, probably, be employed as a substitute for the above. It differs from it in having a cylindrical, striate stem; with opposite, decompound, pinnately divided *leaves*, consisting of from nine to twelve ovate-lanceolate leaflets, acute at each end, entire or three-lobed; *flowers* large, purple, nodding, solitary axillary, campanulate; *sepals* thick, leathery, acuminate, and peduncles from three to six inches long, with a pair of small, simple, entire leaves near the middle.—*W.*

Properties and Uses.—When applied to the skin in a fresh state, they blister it; and if taken internally, act as a corrosive poison. Both drying and boiling destroy the virulent property. They have been used externally in the treatment of several cutaneous affections, and in the form of a liniment made with oil for the cure of itch; internally, as diuretics and sudorifics in chronic rheumatism, palsy, etc., in minute doses. The extract, in doses of one or two grains, is recommended for osteocopic pains. The green leaves bruised are sometimes employed to produce vesication, also, as an escharotic and detergent for venereal and other foul and indolent ulcers.

Prof. C. H. Cleaveland, of Cincinnati, speaks highly of the C. Virginiana as a nervine in uterine diseases; he places two drachms of the dried leaf into a cup filled with hot water, covers it, and allows it to stand until the liquid is cool enough to drink; strain, sweeten with sugar if desired, and let the patient drink it at once. Repeated as often as may be required, the doses being regulated by its effects upon the system. The root of the *C. Dioica*, a native of Jamaica, boiled with sea-water, acts as a powerful hydragogue cathartic, and is useful in dropsy; and an infusion of the leaves and flowers, removes spots and freckles from the skin. The roots of the *C. Vitalba* boiled for a short time to diminish their acrimony, and then infused in boiling oil, were applied to the skin several times a day, in itch, and a cure was effected in twelve or fifteen applications.

COCCULUS PALMATUS.

Colombo.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Diœcia Hexandria.

THE ROOT.

Description.—Colombo is a climbing plant, with a perennial *root*, formed of a number of fasciculated, fusiform, somewhat branched, fleshy, curved, and descending *tubers*, of the thickness of an infant's arm, covered with a thin, brown epidermis, marked, especially toward the upper part, with transverse warts; internally they are deep yellow, inodorous, very bitter, and filled with numerous, parallel, longitudinal fibers or vessels. The *stems*, of which one or two proceed from the same root, are annual, herbaceous, about as thick as the little finger, simple in the male plant, twining, branched in the female, rounded, green; in the full-grown plant, below, thickly clothed with succulent, longitudinal hairs, which are tipped with a gland. The *leaves* are alternate, large, the younger ones thin, pellucid, bright-green, generally three-lobed, upward gradually more numerous; older ones remote, a span in breadth, nearly orbicular, deeply cordate, five to seven-lobed, the lobes entire, often deflexed, wavy on the surface and margin, dark-green above, paler beneath; hairy on both sides; the nerves according to the number of lobes, are three, seven, or nine, pale, connected by veins which, in themselves, are reticulated, prominent beneath. *Petioles* about as long as the leaves, rounded, glandulosopilose, thickened below. The *flowers* are small and indistinct, and are arranged in the male plant in solitary, axillary, drooping, compound *racemes*, covered with glandular hairs, and with small caducous bracts at the base; in the female also axillary, solitary, simple, spreading, shorter than those of the male. *Sepals* six, glabrous; *petals* six, in a single row; *stamens* six; *anthers* terminal, four-celled. The *fruit* is drupaceous or berried, about the size of a hazel-nut, densely clothed with long spreading hairs, tipped with a black, oblong gland. The *seeds* are black, striated transversely, subreniform.—*L.*

History.—This plant inhabits the forests near the coast of Mozambique, and Oibo in East Africa, and has been cultivated at Madras, and in the Isle of France. It was formerly incorrectly described as *Menispermum Palmatum*, and has only recently been properly investigated and classified. It grows abundantly on the south-eastern coast of Africa, in the neighborhood of Mozambique, where it is known by the name of *Kalumb.* The root is dug up in the dry season in the month of March, and as it is very fibrous and ligneous, only its spindle-shaped offsets are removed, being cut in slices, strung on cords, and hung up to dry in the shade. As met with in the shops, Colombo root consists of transverse sections from half an inch to three inches in diameter, and from one to eight or ten lines thick. These sections are composed of a thin, olive-brown and generally rugose cuticle; a thick, bright yellow, easily detached inner bark; and a pith or spongy ligneous internal structure of a pale brown or yellowish color, more or less contracted, often exhibiting dark concentric rings with radiated striæ. The best pieces are those which are firm, dense, and regular, of a lively color, and not much injured by insects. The root is friable and readily reduced to a pale greenish-yellow powder, having a faintly aromatic odor, and an unpleasant, bitter taste, without the slightest acrimony or astringency. The bark has the strongest taste, which is readily taken up by water, alcohol, or ether. The central pith is almost mucilaginous. The powder soon spoils and becomes unfit for use, in consequence of absorbing moisture from a damp atmosphere. It is better to powder the root in limited portions, when required, keeping the powder in closely stopped bottles. According to Planche, and Buchner, the root contains bitter matter, animal matter, yellow resinous extractive, volatile oil, wax, gum, starch, vegetable medulla, woody fiber, and water. Wittstock, in 1830, discovered a bitter principle, which he named *Colombin.* If the genuine Colombo be first dampened, it becomes black when in contact with tincture of iron; iodine added to a decoction of the root, forms the blue iodide of starch; a decoction of the root does not redden litmus paper, nor is there any precipitate (tannic and gallic acids), when tartar emetic, gelatine, or sulphate or sesquichloride of iron are added to it; infusion of nut-galls causes a precipitate (tannate of starch). The American Colombo, *Frasera Walteri*, which is sometimes added to the genuine article, contains no starch, and is not therefore affected by iodine; but it contains tannic acid, and, therefore, becomes blackish green when sulphate of iron is added to its decoction, and yields a precipitate with a solution of gelatine.—*P.*

Colombin may be obtained by treating Colombo root twice or thrice successively with alcohol of specific gravity 0.835. Mix these solutions, distill off three-fourths of the alcohol, and allow the residual liquid to remain at rest for some days. Crystals are deposited which may be collected by throwing the whole on a cloth and allowing the liquid portion to pass through. Let these crystals be washed in cold water, dissolved in alcohol, and the solution digested with ivory black, and filtered. When the solution thus treated is concentrated, it deposits pure crystals of Colombin. The mother-liquor still contains abundance of the same principle, which may be separated by mixing it with powdered glass and evaporating to dryness, stirring it constantly when it begins to become concrete. Digest this mixture of powder and glass in ether, which dissolves wax, fatty matter, and Colombin. Distill off the ether, digest the residue in boiling acetic acid, which takes up only the Colombin, then evaporate, and crystals are formed. Sixty grains are obtained from half a pound of the root. Colombin crystallizes in transparent rhombic prisms, which are inodorous, but very bitter. They are neutral, little soluble in water, alcohol, or ether, at ordinary temperatures, yet giving a bitter taste to them; boiling alcohol dissolves from 1-40th to 1-50th of its weight of them, but on cooling deposits them. Volatile oils sparingly dissolve them. The caustic alkalies dissolve Colombin, from which it is precipitated unaltered by acids; nitric and sulphuric acids dissolve it, but hydrochloric acid has very little action on it. Boiling acetic acid of specific gravity 1.04, is its best solvent. It contains carbon 65.45, hydrogen 6.18, oxygen 28.37.—*T.*

Berberin is said to exist more largely in the Colombo root than Colombin, being in union with Colombic acid, forming a Colombate of Berberin ; Dr. Bödeker obtained it by exhausting the Colombo root with boiling alcohol of specific gravity 0.889, removing as much of the alcohol as possible by distillation; and when a yellowish-brown mass of impure Colombin had separated after three days standing, the supernatant liquid, together with the aqueous solution arising from the rinsing of the impure Colombin, was evaporated to dryness in the water-bath. The residue was exhausted with boiling alcohol of specific gravity 0.863, and this solution again treated as the preceding one. The residue was then treated with boiling water, and the filtered solution mixed with a considerable quantity of muriatic acid. The precipitate thus formed was collected on a filter, and well pressed between paper. Owing to its great solubility in pure water and alcohol, it could not be washed. To remove any free adherent acid, it was dissolved in alcohol of 0.863, and precipitated from this solution by ether. The salt obtained was an indistinctly crystalline bright-yellow powder, of an unpleasant bitter taste, and believed to be the hydrochlorate of Berberine.—*Am. Jour. Pharm.*, XX., 322.

Properties and Uses.—A pure, bitter tonic. Used in dyspepsia, chronic diarrhea, and dysentery; in convalescence from febrile and inflammatory diseases, hectic fever, and in the muscular debility of young children. It has been efficacious in sympathetic vomiting, not connected with gastritis, as in that of pregnant women. Like other strong bitters, it occasionally checks the remittent and intermittent fevers of hot climates. A powerful tonic may be formed of the alcoholic extract of the root. In dyspepsia, and vomiting it may be advantageously combined with the alkaline bicarbonates, as well as in debility with acidity of the stomach. It is used in various combinations, with aromatics, antacids, cathartics, or other tonics. Dose of the powder, from ten to thirty grains, three or four times a day; of the infusion, from one to two fluidounces; of the tincture, from one to two fluidrachms.

Off. Prep.—Infusum Colombæ; Tinctura Colombæ; Vinum Symphyti Compositum.

COCCUS CACTI.

Cochineal.

History.—The cochineal insect, *Coccus Cacti*, belongs to the class *Insecta*, order *Hemiptera;* the general characters are, *tarsi* with one joint, and terminated by a single hook. *Male* destitute of a rostrum, with two wings covering the body horizontally; *abdomen* terminated by two *setæ. Female* apterous, furnished with a rostrum. *Antennæ* of eleven joints, filiform and setaceous. The males are very small, with antennæ shorter than the body, which is elongated, deep red, and terminated by two long diverging setæ; the wings are beautifully snow-white, large, and crossed above the abdomen. The females are nearly twice as large as the males, bluish-red, covered with a white farina, the antennæ short, body convex and flattened below, with short feet.—*P.* They inhabit Mexico, and other parts of tropical America, where they feed on the Opuntia and Cactus families of plants. They are also cultivated extensively in the Canary Islands. They are collected at various seasons. The best are the product of the first collection, which consists of the impregnated females; the males not being gathered. Those killed by the heat of a stove are said to be superior to those destroyed by boiling water. As met with in commerce, Cochineal is in irregular hemispherical grains, flat or concave on one side, and convex on the other, rough and wrinkled, about a line and a half to two lines in diameter, weighing about one-tenth of a grain, dry, friable, of a blackish-red color externally, sometimes covered with a white bloom. Its powder is of a purplish carmine color, and has a musty odor and taste like that of sourish old cheese. When properly kept it is not liable to deteriorate. There are two varieties, *silver grains* and *black grains*. The Silver Cochineal, of a reddish ash color, is said to be procured by destroying the female insect previous to laying its eggs, and is the most esteemed; the Black Cochineal, of nearly a black color, is obtained by killing the female after the eggs have been laid.—*Am. Jour. Pharm. XVIII.*, 47. There is also an inferior sort, consisting chiefly of young insects, called *Granilla.*

Cochineal is nearly odorless, unless in powder, has a warm bitterish taste, feebly acid, and imparts a violet red tinge to the saliva. It has been analyzed by John, and Pelletier and Caventou, and has been found to contain *carmine*, peculiar animal matter, fatty matter, and several salts. The coloring matter of Cochineal is dissolved out by water, alcohol, or proof-spirit. Carmine consists of Cochenillin, animal matter, and an acid.

Carmine may be prepared by boiling one pound of powdered Cochineal and three drachms and a half of subcarbonate of potassa, in a boiler containing seven gallons of water. After boiling for a few minutes, take the boiler off the fire, and place it on a table, inclined to one side so as to facilitate decantation. Add powdered alum eight drachms, and stir the solution. The liquor changes color, and assumes a more brilliant tint. After a quarter of an hour, the Cochineal will have deposited, and the liquor have become as clear as if it had been filtered. It contains the carmine in suspension. The liquor is then decanted into a similar pan, and placed on the fire, adding three drachms and a half of isinglass, which has been previously dissolved in two quarts of water and strained. At the moment of ebullition the carmine rises to the surface, and a coagulum forms as in clarification with white of egg. The pan is then removed from the fire, and the liquor stirred with a spatula. After a quarter of an hour the carmine will be deposited, when the liquor is to be decanted, and the deposit drained on a strained filter, and then dried in a stove at a temperature from 82° to 86°. If dried in the open air it will become moldy. This makes a very fine carmine. The remaining solution will make fine carminated lake. A fine red ink may be made as follows: Take of Cochineal in powder eight scruples, carbonate of potassa sixteen scruples, distilled water eight fluidounces, mix together and boil; then add of alum four scruples, bitartrate of potassa two ounces; let them stand for twenty-four hours, filter, and add of powdered gum Arabic half an ounce.

Dr. Jas. Stark has called attention to a new variety of Cochineal, "cake Cochineal," which is used as a dye-stuff by the natives of Cordova for dyeing cloths all shades of red. It is a solid flat cake, about a quarter of an inch thick, of a deep red color, marked externally as if it had been subjected to pressure between folds of coarse linen, has a jagged fracture with whitish spots occasionally on its surface, and appears to consist of the bodies of the Cochineal insect in various stages of development. It imparted a beautiful red color to water, and furnished a carmine equal to that procured from the commercial drug, though requiring a sixth more of the red dye-cake to produce a color equal to that of ordinary Cochineal.

Properties and Uses.—Anodyne. Used in hooping-cough, and neuralgic affections. Also used to color tinctures and ointments. Dose, from five to ten grains, three or four times a day.

Off. Prep.—Tinctura Cardamomi Composita.

COCHLEARIA ARMORACIA.

Horseradish.

Nat. Ord.—Brassicaceæ. *Sex. Syst.*—Tetradynamia Siliculosa.

FRESH ROOT.

Description.—Horseradish root is perennial, thick, tapering, white, long, acrid, and very tenacious of life, from which arise many large leaves, and from the center a round or angular, smooth, erect branching *stem* rises, about two feet in height; those branches which flower are corymbose, smooth, angular. The *radical leaves* are near a foot long, half as wide, oblong, crenate-toothed, waved, sometimes pinnatifid, of a dark-green color, and stand upon long, channeled petioles; the *cauline leaves* are smaller, lanceolate, dentate or incised, sessile, sometimes entire, and without footstalks; the lower ones often pinnatifid. The *flowers* are numerous, small, white, peduncled, and in terminal corymbose racemes. The *calyx* is ovate, spreading, equal at the base; *sepals* four, concave. *Petals* obovate, obtuse, entire, claw-like. *Stamens* without teeth, the length of the calyx; *anthers* cordate; *silicle* sessile, oblong or ovoid-globose, compressed; *dissepiment* thin; *valves* ventricose, thickish; *cells* many-seeded; *seeds* not bordered; *cotyledons* flat, accumbent.—*G.*—*W.*—*L.*

History.—This is a well-known succulent plant, a native of Europe, and extensively cultivated for the use of its roots as a condiment. It flowers in June. The fresh root is the officinal part, and should be dug up in the autumn, as its acrimony is then the strongest; it may be preserved for some time fresh, by burying it in a cool place in sand. The root is whitish-yellow externally, white internally, of various lengths tapering to a point, from half an inch to two inches or more in diameter at its thickest part, fibrous, fleshy, succulent, of a very pungent taste and odor, producing a flow of tears, and when smelt violent sneezing. Water, alcohol, or vinegar extracts its properties, which depend upon the presence of a volatile oil, and which is dissipated by heat or desiccation.

The oil passes over when the root is distilled with water; it is of a light yellow color, possessing the pungent properties of the plant in a high degree, causing irritation and even blistering when in contact with the skin. It is supposed to be perfectly identical with the volatile oil of mustard, and is obtained in minute proportion, six parts only of the oil being procured from ten thousand of the root. It is believed not to exist already-formed in the unbroken root, but to be developed by the mutual reaction of its constituents when the root is bruised. The dried root possesses no pungency, and yields no volatile oil when distilled with water, unless white mustard be added; the myrosine of the mustard supplying some necessary principle destroyed by desiccation. In addition, the root contains a bitter resin, sugar, gum, starch, extractive, albumen, acetic acid, acetate and sulphate of lime, water and lignin.

Properties and Uses.—Stimulant, diuretic, antiscorbutic, and rubefacient. It promotes all the secretions, the urinary in particular, and stimulates the stomach, when this organ is enfeebled. The infusion is emetic. It has been used with advantage in chronic affections attended with debility of the digestive organs, and of the general system, as in paralysis, rheumatism, dropsy, and as an antiscorbutic in scurvy. In dropsy, an infusion of the root in cider and drank as warm as could be borne, in large quantities and freely, the patient being warmly covered up, has caused copious diuresis and diaphoresis, and cured the disease in a few weeks; the operation being repeated nightly, or as the strength of the patient would permit. Horseradish is much employed to produce abortion, frequently effecting this object, when other internal agents fail; it is used as follows: make a saturated infusion of the recent roots in whisky, of which four fluidounces is the dose, repeating it three or four times every day, and continuing its use until the desired effect is produced. The grated root with sugar to form a syrup with water, is excellent for hoarseness, a spoonful or two may be swallowed as occasion requires. It has been also used externally, as a rubefacient. Dose of the root grated, from one to two drachms.

The *Cochlearia Officinalis*, or scurvy grass, is seldom used in medicine; it possesses similar properties.

Off. Prep.—Infusum Opii Compositum. Infusum Armoraciæ.

COFFEA ARABICA.

Coffee.

Nat. Ord.—Cinchonaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE SEEDS.

Description.—Coffee tree is an evergreen, large, erect bush or shrub, quite smooth in every part, the bark being of a brownish color, and its branches opposite. The *leaves* are opposite, oblong-lanceolate, acuminate, shining on the upper side, wavy, deep green above, paler below; *petioles* short; *stipules* subulate, undivided. The *flowers* are white, sweet-scented, on short, axillary, four or five clustered peduncles; *corolla* tubular, with a five-cleft limb. *Calyx* small, five-toothed. *Stamens* inserted in the middle of the upper part of the tube; *anthers* yellow, linear, protruded. The *fruit* or *berry* is oval, deep-purple, umbilicate at top, succulent, two-seeded; *seeds* somewhat plano-convex, with a longitudinal fissure on the flat side, they form the commercial Coffee.—*L.*

History.—The Coffee plant is a native of Arabia Felix and Ethiopia, and is extensively cultivated in Asia and America between the north and south latitudes of 56°. The plant is propagated from the seed, which sprout in three or four weeks, and are sufficiently advanced in the course of twelve months for transposition. The fruit appears in about three years, and the ripening of the seeds may be known by the dark-red color of the berries, when they must be gathered, else they will fall off spontaneously. The fleshy part is removed from the seeds by certain apparatus, and their thin covering is detached after drying. There are many varieties of Coffee, the characters of which depend upon the soil, the locality and the method of cultivation. The *Mocha Coffee* is esteemed the best, and the *Java* next; but the coffee consumed in this country is chiefly furnished from Brazil, Demarara, Jamaica, and other West India islands. Good Coffee should be firm and solid, and heavier than water, in which it immediately sinks; a blackish-colored Coffee, not compact, and floating on the top of water, is an inferior article. Coffee has a feeble, characteristic odor, and a rough, sweetish, peculiar taste. According to Payen, it contains cellulose, hygroscopic water, fatty substances, dextrine, glucose, and an undetermined vegetable acid, legumin, casein, chlorogenate of potassa and caffein, a nitrogenous substance, free caffein, a concrete essential oil, aromatic fluid volatile oil, and mineral substances.—*P.*

H. J. Versman states the following to be the most profitable and simple mode of obtaining caffein: Ten parts of bruised Coffee are mixed with two parts of caustic lime, previously converted into hydrate of lime. This mixture is placed in a displacement apparatus, with alcohol of 80°, until the fluid which passes through no longer furnishes evidence of the presence of caffein. The Coffee is then roughly ground, and brought nearly to the state of a powder, and the refuse of the already once digested mixture from the displacement apparatus dried, and ground again, and, mixed with hydrate of lime, is once more macerated. The grinding is more easily effected after the Coffee has been subjected to the operation of the alcohol, having lost its horny quality, and the caffein is thus certainly extracted. The clear alcoholic fluid thus obtained is then to be distilled, and the refuse in the retort to be washed with warm water to separate the oil. The resulting fluid is then evaporated until it forms a crystalline mass, which is to be placed on a thick filter, and the moisture expressed.

The moisture, after evaporation, still furnishes some caffein. The impure caffein is freed from oil by pressure between folds of blotting-paper, and purified by solution in water with animal charcoal, and then crystallized by evaporation. Good Brazilian Coffee, thus yields 0.57 per cent of caffein.

Caffein crystallizes in white, silky, long needles, which are slightly flexible and transparent, and have a specific gravity of 1.23. Its taste is weak, but bitter and unpleasant. It is fusible, volatile, and soluble in water, alcohol or ether. At an elevated temperature it sublimes in needles similar to those of benzoic acid. Tannic acid precipitates it from a watery solution. Its present formula is $N_2\ C_8\ H_5\ O_2$, and according to the analysis of theïn from tea by M. Jobst, caffein appears to be identical with it. Caffein gives with iodide of potassium and mercury, a precipitate of white, shining, acicular crystals.—*P.*—*T.*

The Hanoverian Pharmacopœia directs caffein to be made by precipitating a decoction of Coffee with acetate of lead, filtering and washing the precipitate, evaporating the liquids to dryness, and after mixing the powdered extract with sand, the mass is sublimed in Mohr's apparatus, just as in making benzoic acid.

With a view of extracting all the caffein from Coffee, M. Pucetti tried the following method: He brought the decoction of Coffee to the consistence of an extract, and treated it with alcohol, which left undissolved a resinous substance of the appearance of bird-lime; he then dissolved a slight excess of pulverized caustic lime in the alcoholic fluid, which, when filtered and evaporated to the necessary degree, furnished crystals of impure caffein. This was pressed between thick linen, to get rid of the adherent mother liquor, and then dissolved in well-water and treated with animal charcoal, by which means the alkaloid was obtained pure. One pound of Coffee yielded one-twentieth of an ounce of caffein. He also obtained it in larger quantity from tea.

Vogel's new process for procuring caffein is, to treat ground Coffee with benzine; this dissolves out the caffein and fixed oil. Distill the benzine solution, and boil the residue in water, which dissolves the caffein, and deposits it on filtering and concentrating the liquid.

By roasting, Coffee acquires new properties, it expands considerably, becomes lighter by 16 or 18 per cent., has a peculiar, agreeable odor imparted to it, and a bitterish, aromatic taste, owing to the products of the torrefaction, viz., a brown aromatic oil, and a brown bitter principle; the caffein, however, appears to remain unchanged. The flavor of Coffee depends upon its aromatic volatile oil, and if the roasting process is carried too far, this is dissipated, and the Coffee then becomes bitter without the aroma. Roasted Coffee should be of a chocolate-color, should be used soon after roasting, and should be ground only as wanted, as otherwise it loses nearly all its flavor and activity. Roasted corn, peas, beans, oats, rye, or potatoes when added to Coffee, may be known by the deep-blue, blackish-blue, or purplish-red color which a solution of iodine imparts to the infusion; pure and roasted Coffee in infusion, is rendered of a deeper reddish-brown tint by the iodine.—(*See Chicory.*)

Properties and Uses.—An infusion of roasted Coffee is an agreeable stimulant, antisoporific, and anti-emetic. It produces a mild stimulating influence upon the organs of digestion, and slightly accelerates the circulation; taken too freely, it impairs the nervous and digestive systems. A cup of strong Coffee will cause a degree of wakefulness for several hours, and will frequently overcome the soporific or intoxicating effects of opium or alcohol. In poisoning from opium it should always be given. It has also proved temporarily useful in light nervous headaches, asthma, hysteria, obstinate chronic diarrhea, and also calculous nephritis. It is contra-indicated in all inflammatory affections of a high grade. Dr. A. Brown, of Cincinnati, has found a strong decoction of the pulverized, unroasted Coffee, a superior remedy in some forms of chlorosis or amenorrhea. When fullness in the head, and pain in the back are present, he gives a gentle purgative, then uses the warm foot-bath, and administers the decoction in wineglassful doses every half-hour or hour.

Coffee has also been used with much success in hooping-cough, in the form of syrup, made with the extract of Coffee prepared without heat, or a strong infusion by percolation, given in small and repeated doses. Dr. L. Delahage gives the following formulæ as almost infallible: Take of syrup of extract of Coffee four pounds, extract of belladonna, extract of ipecacuanha, of each two scruples. Mix together. Dose, two fluidrachms or a dessertspoonful, morning and noon, and double this dose at night on going to bed, for children of three to five years old; it should be taken in two or three tablespoonfuls of warm water.

Prof. Lehman considers Coffee to increase the activity of the vascular and nervous systems, while at the same time it retards the metamorphosis of plastic constituents; and which effects are owing chiefly to its empyreumatic volatile oil.

Dr. W. Hamilton considers the free use of strong Coffee almost a specific for gout, rheumatism and gravel.

It has been observed by Dr. Moseley, in his *Treatise on Coffee*, that "the great use of Coffee in France is supposed to have abated the prevalence of the gravel. In the French colonies, where Coffee is more used than in the English, as well as in Turkey, where it is the principal beverage, not only the gravel, but the gout, those tormentors of so many of the human race, are scarcely known. Du Four relates, as an extraordinary instance of the effects of Coffee in gout, the case of Mr. Deverau. He says this gentleman was attacked with gout at twenty-five years of age, and had it severely till he was upward of fifty, with chalk-stones in the joints of his hands and feet; but for four years preceding the account of his case being given to Du Four to lay before the public, he had been recommended the use of Coffee, which he had adopted, and had no return of the gout afterward." But its efficacy is not confined to the cure or mitigation of these maladies. Sir John Floyer, who had suffered under asthma for more than sixty years, without finding relief from any of the numerous remedies he tried, was at length cured, when above eighty years of age, by the free use of Coffee.

The *Citrate of Caffein*, recommended as a remedy for the idiopathic headache, called migraine (pain in the forehead), may be obtained by two processes; the most simple consists in infusing finely-ground raw Coffee in a very weak solution of citric acid, at the temperature of 176° F., filtering the liquid while yet hot, adding two-thirds of its volume of ether, and agitating the mixture strongly, to remove the chlorogenic acid from the watery solution. The latter is separated from the supernatant ether, and is carefully evaporated with a gentle heat. The citrate of caffein crystallizes in long needles, which, when redissolved in distilled water and again evaporated, are obtained in beautiful, long, acicular, white, silky crystals, in radiating groups.

The second process consists in making the compound by the direct union of its constituents, the caffein being dissolved in a weak solution of citric acid at the temperature of 112° F., and the solution evaporated till the citrate crystallizes.

This salt is very soluble in water, and is assimilated much more readily than pure caffein when taken into the stomach. It consists of one equivalent of caffein, three of citric acid, and two of water. It may be made into a pill mass with some simple extract, say eight grains of the salt to fifteen of the extract, and divided into ten pills, of which one may be given every hour or two. Or, two drachms and a half of the salt may be dissolved in four ounces of simple syrup, of which one tablespoonful may be given as above, according to the violence of the attack.

According to Dr. Stenhouse, the *dried leaves* of Coffee roasted forms a very agreeable infusion, and which may be used as a substitute for tea and coffee. They contain a much larger amount of caffein than the Coffee-bean, with caffëic acid, and will probably, ere long, be extensively used in the same manner as tea. According to Jas. Motley, Esq., the natives of Sumatra cultivate the Coffee plant extensively, but use only the leaves, entirely neglecting the berries. They are fastened upon strips of bamboo, held over a clear blazing fire, until they acquire a rich, brownish-green color, and become perfectly crisp and brittle, then powdered and infused in boiling water, forming a dark-brown liquid of the odor of tea, but the flavor of a mixture of tea and coffee. This is much used by them as a beverage.

Roasted Coffee is a powerful deodorizer, destroying the effluvia from decomposed animal and vegetable matter.

COLCHICUM AUTUMNALE.

Colchicum.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Hexandria Trigynia.

CORMUS OR BULB, AND SEEDS.

Description.—This plant is also known as *Meadow Saffron.* The *corm* is large, ovate, solid, fleshy. The *leaves* are dark-green, very smooth, obtuse, above a foot long, an inch and a half broad, keeled, produced in the spring, along with the capsules. *Flowers* several, radical, leafless, bright purple, with a long white tube appearing in the autumn without the leaves; *capsules* three, distinct, though forming together a single, oblong, elliptical fruit, with intermediate fissures. *Seeds* whitish, polished.—*L.*

History.—Colchicum grows in meadows and low, rich soils in many parts of Europe, and is common to England. The herb is annual, but the root is annual or perennial according to the manner in which the plant is propagated, which may be from the seed, by the formation of a single mature bulb from a parent bulb, or by the separation of several immature bulbs from the parent. A brief reference to its mode of development may be useful. "In June or July a new bulb about the size of a grain of wheat, is formed at the lower end of the old one, in close approximation with its radicles; this little bulb increases with rapidity, and at the same time sends up a leafless flower-stem. Toward the first of October a lilac or pale purple flower springs from the ground, the germen remaining at the base of the corolla tube, but the leaves do not appear until early in the ensuing spring, at which time the germen, consisting of three many-seeded capsules, is elevated, and the seed are matured during midsummer, after which the plant speedily withers. While the flower is rising in the autumn, the bulb is very small, but in the winter it grows rapidly, being in April as large as a chestnut, and attaining its greatest size, about that of a small apricot, in July. It is now a year old, and the herb having matured its seed, is withering away, but a new bulb begins to appear at its lower end, close to its junction with the radicles or root proper, which passes through a similar succession of changes; while the old parent bulb gradually becomes more spongy and watery, but retains its size until the following April, the second spring of its own existence, when it quickly decays."—*C.* The seeds and the bulb are the officinal parts of the plant. The bulb attains its greatest perfection about the beginning of July, at which time it should be gathered for medical use. It resembles a small tulip root, convex on one side, plane on the other, being brown externally, white internally, and containing a white acrid juice. The odor is *hircine*, and the taste bitter, acrid, and nauseous. In drying, the bulb is usually cut into thin transverse slices, having first been stripped of its external dark brownish-black membranous tegument, and is dried quickly; sometimes it is dried entire.—*C.*—*Ed.*

Good Colchicum bulbs, when dried, are of an oval-rounded form, with a notch or deep groove on one side, of a grayish-white color, an amylaceous appearance, firm, dry, and capable of changing their color to blue when softened with distilled vinegar, and then touched with tincture of guaiacum. The odor is much less than in the fresh bulb, and the taste is strongly bitter, disagreeable, and somewhat acrid. Its virtues are imparted to alcohol, vinegar, or wine. The acetic tincture is generally preferred to the vinous, as it is not so liable to change or decomposition. Acids render the vinous tincture drastic, while alkalies render its operation milder. It contains supergallate of colchicia, fatty matter composed of olein, stearin, and volatile acid, yellow coloring matter, gum, starch, inulin in abundance, lignin, and a minute quantity of ashes. The decoction of the fresh bulb forms, with a solution of iodine, a deep-blue precipitate (*iodide of starch*); with sesquichloride of iron, a faint bluish tint (*gallate of iron*); with diacetate of lead, or protonitrate of mercury, a copious white precipitate; with nitrate of silver, a white precipitate which soon becomes black; with tincture of nut-galls, a very slight, dirty-looking precipitate; and, with a solution of gelatine, a slight haziness.—*P.*

Colchicum seeds should be gathered early in August, when they are fully ripe; they are rough, roundish, dark-brown, about a line and a half in diameter, and possess the same bitter, acrid taste with the bulb, but in greater intensity.—*C.* It was formerly supposed that their medicinal virtues resided in the husk or cortical part, and it was advised not to bruise them in making the tincture, but recent experiments have proved that the bruised seeds yield the strongest tincture. Their properties are similar with those of the bulb, and as they are considered more uniform in strength than the bulb, they are usually preferred to it.

Colchicia may be obtained by the same process through which hyoscyamia is obtained from henbane. (*See Hyoscyamus.*) Geiger and Hesse have published a simpler process, as follows: Digest the seeds in boiling alcohol, this dissolves a supersalt, which must be precipitated with magnesia; treat the precipitate with boiling alcohol, filter, and evaporate. The colchicia is crystallizable, alkaline, inodorous, and bitter. It differs from veratria by being a milder poison, crystallizable, more soluble in water, does not excite sneezing when applied to the nose. One tenth of a grain of colchicia, dissolved in weak spirit, killed a young cat in about twelve hours. A very minute dose causes purging and vomiting.—*P.*

Properties and Uses.—In large doses, an acro-narcotic poison. Medicinally, sedative, cathartic, diuretic, and emetic. Used in gout and gouty rheumatism, dropsy, palpitation of the heart, gonorrhea, enlarged prostate, etc. Care must be used in its employment. It sometimes increases the uric acid in the urine of arthritic patients; and has been beneficially employed in febrile, inflammatory and nervous affections, and in chronic bronchial complaints. Equal parts of Tincture of Colchicum and Laudanum, have been found efficacious in some cases of gonorrhea. A good acetic tincture may be made by macerating an ounce and a half of the dried bulb, or seeds, in twelve fluidounces of the strongest vinegar for fourteen days. Then filter, and keep in well-stopped bottles. The dose for an adult is from thirty to sixty drops, as often as may be required. An *acetic extract* may be prepared, containing all the powers of the plant, by rubbing the bulbs to a pulp to the quantity of a pound, and gradually adding acetic or pyroligneous acid three fluidounces. Express the liquid, and evaporate it in an earthen vessel not glazed with lead, to the proper consistence; the dose is from one to three grains, three or four times a day. Dose of the dried bulb, from one to ten grains, gradually increased every four or six hours, till the influence of the medicine is obtained.

Off Prep.—Tinctura Colchici Composita; Tinctura Colchici Seminis; Vinum Colchici Radicis; Vinum Colchici Seminis.

COLLINSONIA CANADENSIS.

Stoneroot.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE PLANT.

Description.—This plant, known likewise by various other names, as *Hardhack*, *Horseweed*, *Heal-all*, *Richweed*, *Ox-balm*, etc., is an American herb, with a knobby *root*, and a four-sided *stem*, smooth or slightly pubescent, and from two to four feet in height. The *leaves* are thin, broadly ovate, acuminate, coarsely serrate, petiolate, glabrous, from six to eight inches long by three or four wide. The *flowers* are in a large, paniculate, terminal raceme, with opposite branches and pedicels; *corolla* greenish-yellow, two thirds of an inch long, having a lemon odor, funnel form, somewhat bilabiate, the lower lip elongated and fringed. *Calyx* bilabiate, upper lip three-toothed, the teeth short, subulate, lower lip bidentate. *Stamens* two, very long. *Seeds* four, of which two or three are sterile.—*W.—G.*

History.—Hardhack is found growing in rich moist woods, from Canada to Florida, and flowering from July to September. The whole plant has a peculiar, lemon-like, balsamic odor, rather disagreeable in the root, and a spicy pungent taste. Water or alcohol extracts its virtues; boiling destroys it, as the active principle is volatile. The fresh root is the part used.

Properties and Uses.—Stoneroot is a stimulant and irritant, and when fresh, will cause emesis when swallowed in minute quantity. It seems to exert an influence on mucous tissues, and has been found beneficial in chronic catarrh of the bladder, fluor-albus, and debility of the stomach. As a stimulant it has been used in infusion in colic, headache, cramp, dropsical affections, etc. It also possesses gently tonic and diuretic properties, and has been used with efficacy in lithic acid calculous deposits, and other affections of the urinary organs. The warm infusion will produce perspiration. Externally, the leaves are used as a poultice or in fomentation to bruises, ulcers, blows, wounds, sprains, contusions, etc. The *Collinsonia Verna*, *C. Cordata*, *C. Ovata*, *C. Scabra*, and other species, probably, possess similar virtues. Dose of the infusion, from half a fluidounce to two fluidounces.

Off. Prep.—Infusum Collinsoniæ.

COLLODION.

ETHEREAL SOLUTION OF GUN-COTTON.

Preparation.—" *Thirty parts* of concentrated Sulphuric Acid, and *twenty parts* of powdered Nitrate of Potassa, are placed in a glass cylinder, well stirred with a glass rod, and *one part* of clean and lightly compressed Cotton Wool that has previously been well dried, added; after being allowed to remain not more than five minutes, it is withdrawn and thrown into a dish of cold water, well washed several times with fresh water, to remove every trace of acid, spread out on a glass plate, and dried at the ordinary temperature. The dried preparation (named from its explosive properties, Gun-Cotton) is pulled and cut as finely as possible, then placed in a bottle with *thirty times its weight* of Ether, and thoroughly shaken for some minutes, allowed to digest with occasional shaking for some hours, strained through thick linen, and the clear solution kept in well-stopped bottles. Only carefully prepared gun-cotton must be used for Collodion, and that which, having undergone no change, does not redden moistened litmus paper."— *Witt.*

Mr. Wm. Procter, jr., offers the following formula as an excellent one for making Collodion, being less mucilaginous than that obtained by the U. S. P. formula, but more adhesive, and drying more rapidly: Mix in a suitable vessel capable of being covered, fuming Nitric Acid, sp. gr. 1.42 to 1.45, and Sulphuric Acid, of each, *four fluidounces;* introduce Cotton free from impurities, *half an ounce*, and after pressing it into the acid until perfectly immersed and saturated, allow it to stand four days. The cotton should then be removed, the excess of acid pressed out, and then thoroughly washed till it is neutral to litmus paper. It should now be strongly pressed between bibulous paper, then immersed in strong Alcohol to abstract the adherent water, and again pressed, when it may, without further drying, be put in *two and a half pints* of Ether, and dissolved.

By the action of sulphuric acid on nitrate of potassa, there are formed bisulphate of potassa and free nitric acid. For the entire decomposition of the nitre in the warm its weight of sulphuric acid is necessary; the first method above gives half as much again of sulphuric acid, which partly compensates for the want of artificial heat, and also insures the nitric acid in the most concentrated form. Of course this last acid may be obtained by mixing the strongest nitric acid with a third, half, or equal volume of concentrated sulphuric acid, but the nitre is preferred as producing a cotton of greater solubility in ether. To obtain good results the above method must be strictly followed; the cotton immersed in the mixture of nitre and sulphuric acid just made (and still warm), and not allowed to remain in it more than five minutes, otherwise it acquires a yellow color, loses its looseness of texture, and is only partially soluble in ether. The change which the cotton wool, $C_{12}\ H_{10}\ O_{10}$, undergoes by the action of the nitric acid is to lose the elements of three equivalents of water, which are replaced by three equivalents of nitric acid. One equivalent $C_{12}\ H_{10}\ O_{10}$ and three eq. NO_5, form one eq. $C_{12}\ H_7\ N_3\ O_{22} = C_{12}\ H_7\ O_7 + 3\,NO_5$ and three eq. HO.

2,025 parts of cotton wool should give 3,713 parts of gun-cotton, but somewhat less than this is obtained, as some portion of the cotton wool almost always remains unacted on. The gun-cotton experiences an incipient decomposition when gently warmed, increasing with the temperature to 268° F., when it explodes. The drying, consequently, must take place only at the ordinary temperature, but even then, after some time, the gun-cotton undergoes a change, acquiring the smell and acid reaction of nitric acid, becoming, according to the extent of the decomposition, less and less soluble in ether. It is better to use that recently prepared for Collodion. Ether dissolves the pure product entirely, leaving the cotton wool behind, consequently, the solution never has a bright appearance; most of the cotton is removed by straining, the remainder deposits on standing; when strained it is clear enough for all ordinary purposes. — *Witt.*

History.—Collodion is a colorless, thickish liquid, having a neutral reaction, an ether-like odor and taste, and when not kept in well secured vessels, it thickens and becomes unfit for surgical use, frequently depositing acicular crystals of gun-cotton. When prepared from gun-cotton slightly decomposed, it has an acid reaction, and yields an opaque residue, which is not adhesive, and consequently useless.

Properties and Uses.—When placed upon the surface of the body, the part being dry, by evaporation of the ether, a transparent, extremely electric, and adhesive film is left, forming an artificial epidermis; in drying, the Collodion contracts very strongly, producing local pressure. It has been successfully used in sore nipples, erysipelatous diseases, leech-bites, ulcers, burns, wounds, abrasions, and several cutaneous diseases, over which, when applied, it forms a coating impervious to air, and not affected by water. It may be placed upon the part by means of a camel's hair brush, or by layers of thin muslin. In ulcerations around the neck of the uterus, Collodion has been found beneficial, forming, after the evaporation of the ether, a thin film or coating over the ulcers, thus protecting them from atmospheric influence, and facilitating their healing. In many instances, Collodion is not commendable, on account of its powerful contraction, which, however, may be obviated by adding to a solution of one drachm of gun-cotton in two and a half ounces of ether, one drachm of Venice turpentine. M. Sourisseau renders Collodion more pliable by adding one-twelfth part of elemi to it. The same property is imparted to it, as stated by M. Startin, by adding one-eighth or a sixteenth of an ethereal solution of animal fat. Collodion may likewise be prepared pliable and without any tendency to crack or break, by the following formula: Take of Collodion thirty grammes, Castor-oil and Soft Turpentine, of each fifty centigrammes. Collodion is said to have given instant relief in chilblains.

A vesicating Collodion may be made as follows: exhaust a pound of cantharides, in coarse powder, by means of a displacement apparatus, with a mixture of sixteen fluidounces of ether, and three fluidounces of acetic ether; in the filtered liquid dissolve three or four drachms of gun-cotton; five or six drachms of Venice turpentine will add to its elasticity. It must be kept in the same careful manner as Collodion. The part required to be blistered may be painted with two or three layers of this mixture• and then covered with oil silk or other material; vesication will be produced in from two to four hours.—*Ward.*

COMPTONIA ASPLENIFOLIA.

Sweet Fern.

Nat. Ord.—Myricaceæ. *Sex. Syst.*—Monœcia Triandria.

THE PLANT.

Description.—Sweet Fern is a low, indigenous shrub, with a long, horizontal root, and growing from two to four feet high, the main stem being covered with a rusty, brown bark, which becomes reddish in the branches, and white downy in the young shoots. The *leaves* are numerous, on short peduncles, from three to four inches in length, and half an inch broad, alternate, linear-lanceolate, sinuate-pinnatifid, resembling the leaves of the spleenwort fern, brown, and rather downy on the underside, shining on the upper; *stipules* in pairs, acuminate. *Flowers* green, monœcious, amentaceous and appearing before the leaves; barren ones in long, erect, cylindrical, loosely imbricated catkins, terminal and lateral, with deciduous, one-flowered bracts; fertile ones in ovate, densely imbricated catkins, situated below the barren ones, with one-flowered bracts. *Stamens* six, adhering in pairs. *Sepals* six, larger than the bracts; *styles* two, capillary. *Fruit* a small, ovate, brown, one-celled nut.—*L.*—*W.*

History.—This plant is found growing in thin sandy soils, or dry, rocky woods, from Maine to Kentucky, flowering in May. The whole plant possesses a spicy, aromatic odor, especially when bruised, and an aromatic astringent, faintly bitterish taste. The whole herb is used, and imparts its virtues to water or alcohol.

Properties and Uses.—Tonic, astringent, and alterative. Used in diarrhea, dysentery, hemoptysis, leucorrhea, rheumatism, debility succeeding fevers, and in rachitis. A decoction of it is very useful in the summer-complaint of children, when given as an auxiliary. A pillow of the leaves is beneficial to rachitic children, and they may be used as a fomentation in contusions and rheumatism. Dose of the decoction, from one to four fluidounces, three or four times a day.

Off. Prep.—Decoctum Comptoniæ.

CONIUM MACULATUM.

Poison-Hemlock.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

LEAVES AND SEEDS.

Description.—Poison Hemlock, or *Poison Parsley*, as it is sometimes called, has a biennial, fusiform, whitish, fleshy *root*, and *stem* from three to five feet high, erect, round, hollow, glaucous, polished, copiously spotted and dotted with dull purple. The *leaves* are tripinnate; the lower ones very large, several times pinnate, bright green, on long, sheathing footstalks. The *leaflets* are ovate, lanceolate, pinnatifid, with the lower lobes incised. The *flowers* are numerous, small, white, all fertile, the outermost very slightly irregular, they are arranged in erect, terminal, compound, many-rayed and smooth *umbels*. *General involucre* ovate, cuspidate, with membranous edges, consisting of from three to seven lanceolate, reflected bracts, with whitish edges; *partial involucre* of three or four, oval, pointed, spreading bracts, and with the inner side wanting. *Petals* obcordate, with acute, inflected points, and five in number. The *fruit* is about a line and a half, or rather less in length, by a line in breadth, roundish-ovate, compressed, of a pale-green color; primary ridges elevated, sharp, undulated; commissures and channels finely wrinkled. The whole plant exhales a disagreeable, virose odor, more especially when bruised.—*L.*—*W.*

History.—Hemlock inhabits Europe and Asia, and has been introduced in many parts of this country; it flowers from May to August. The leaves and seeds are the parts used. The leaves are best when collected during the flowering season of the herb; they should be speedily dried by a gentle heat, not over 118° F., and placed in closely covered vessels, to preserve them as much as possible from the influence of the atmosphere, and light. The fruit, or seeds, as they are usually termed, should be gathered shortly previous to their becoming ripe; their medicinal properties do not diminish so soon as those of the other parts of the plant. If properly dried, the leaves should have a fine green color, with a disagreeable odor, less powerful than in the fresh plant, and a peculiar, nauseous, saline, and somewhat acrid taste. The seeds are of a dirty white, or grayish color, with very little smell, and a slight, rather bitter taste. Both the leaves and seed yield their virtues to alcohol or ether; the latter menstruum furnishes an excellent extract, possessing the properties of the plant in a high degree, so that a half-grain dose will cause decided narcosis. The aqueous extract is uncertain ; the alcoholic extract is the best, but even this becomes destitute of conia in a few years.—*P.* There has been no thorough analysis of this plant,—a volatile oil, vegetable albumen, resin, coloring matter, salts, lignin, moisture, and a peculiar basic principle, conia, have been found in it. When hemlock leaves are subjected to a strong decomposing heat, they yield an empyreumatic oil, which is very poisonous.—*C.* A volatile, alkaline principle termed *Conia* or *Conicine*, is the active agent of the plant ; it may be obtained by cautiously distilling from a muriate of lime bath, a mixture of strong solution of potassa with the alcoholic extract of the unripe fruit. The alkaloid passes over into the receiver with the water, and floats upon it like an oil. Or, the full grown, but still green fruit, may be distilled with water, caustic potassa, and slaked lime, from a muriate of lime bath, then neutralize the distilled fluid with sulphuric acid, and concentrate it by evaporation to a thin extract ; act on this with a mixture of two parts of rectified alcohol and one of sulphuric ether, and again obtain an extract by evaporation, and finally distill the extract with a strong solution of caustic potassa. As obtained in either of these ways, conia contains—some water, which may be removed by chloride of calcium—and also a little ammonia, which is separated by placing it on an air-pump under a receiver, and exhausting it as long as gaseous bubbles are given off.—*C.* In preparing this alkaloid, the fresh portions of the plant should be used, as drying and exposure decomposes it. Eight pounds of the green fruit will yield half an ounce of hydrated conia, beside a considerable portion which is decomposed in the process.

When pure, Conia is an oily-looking, transparent, colorless liquid, but becoming brownish by oxidation, of specific gravity 0.89, with a very penetrating, tobacco-like odor, and a sharp, acrid, benumbing and offensive taste. At ordinary temperatures it is volatile, disengaging ammonia, depositing a resinous matter, and losing its activity ; its vapor excites a flow of tears. It is sparingly soluble in water ; but forms a hydrate by uniting with about a fourth part of water. It is very soluble in alcohol, ether, the fixed and volatile oils, and also in weak acids, which it neutralizes. It boils at 370°, and distills over with water at 212°. It strongly blues reddened litmus paper ; it forms soluble salts with acids which are difficult to crystallize. Weak tincture of iodine yields a white precipitate, which acquires an olive color with an excess of the tincture. Tannic acid gives a white, insoluble precipitate ; corrosive sublimate gives a white precipitate ; chloride of zinc gives a white gelatinous precipitate, soluble in excess of the Conia. Sulphate of sesquioxide of iron and chloride of platinum yield yellow precipitates ; chloride of gold a light yellow. Chloride of cobalt yields a blue precipitate which changes to green, and which forms with ammonia a red solution. Acetate of copper gives a gelatinous blue precipitate. The red permanganate of potassa is immediately decolorized. Hydrochloric acid yields white clouds as ammonia does, and renders it violet, especially when heated. Nitric acid imparts to it a topaz color, unchanged by heat. Pure and concentrated sulphuric acid does not alter it; but if heated produces a greenish-brown color, which becomes blood-red, and finally black, if the heat be continued. Albumen is thickened by it; potassa added to a salt of Conia sets the base free, which is then recognized by its odor; heat produces the same effects on most of its salts. Conia possesses the same remarkable action on the spinal cord as hemlock itself. A few drops will suffice to kill a cat, rabbit, or young dog; a strong cat was killed in a minute and a half, by three drops of it. Its effects are gradual paralysis, slight convulsive tremors, and death from suspension of the breathing, without any change in the appearance of the blood, and without any depression of the heart's action. According to Liebig its constituents are $C_{12} H_{14} NO$; but Artigosa gives its formula as $C_{16} H_{16} N$.

Properties and Uses.—Narcotic. The symptoms produced by its use are thirst, dryness of the throat, dizziness, sickness at stomach, sinking, benumbing feelings, and more or less prostration of the muscular system. If its use be continued or in large doses, the pupils become dilated, there is a general paralysis, rendering talking and breathing difficult, with coma, or convulsions terminating in death. In about thirty minutes from its administration, its effects will generally appear, and continue from ten to forty hours. It is supposed to effect its results by exhausting the nervous energy of the spinal cord, and voluntary muscles. It is used for promoting sleep, and will be found extremely useful in allaying excessive action of the heart in hypertrophy of this organ; a pill of one or two grains of the extract producing a calm, soothing influence, followed by a diminution or removal of the palpitation or augmented action. Indeed, all affections attended with an excited or excitable condition of the nervous and vascular systems, will be benefited by its use. I have used a preparation which I call the *Conium Mixture*, with much advantage in several diseases; it is prepared as follows: Take of Precipitated Carbonate of Iron *ten drachms;* inspissated juice of Conium *five drachms;* Tincture of Balsam Tolu *six ounces;* Oils of Cinnamon and Wintergreen, of each, *twelve drops;* White Sugar *two ounces;* Madeira Wine, Water, of each, *half a pint.* Mix together, in a week the mixture will be ready for use. In dyspepsia attended with irritation of the stomach, pyrosis, or with an excitable state of the system from debility, this mixture will be found very beneficial; it may be given in doses of from a drachm to half an ounce, from three to six times a day before eating. Laxatives should be occasionally employed. In cough, Conium will be found of much utility: I have used the following preparation in the cough attending phthisis, also in other coughs, with benefit: Take of Tincture of Cyanuret of Potassium (made by adding *twenty-two grains* of the Cyanuret to *nine fluidounces* of Proof Alcohol), *six drachms;* Conium Mixture *three ounces;* Tincture of Opium *four drachms.* Mix. Dose, half a drachm to a drachm, three or four times a day. In intermittent fever I have frequently derived a happy effect from the following pill, when quinia alone failed: Take of Sulphate of Quinia *ten grains;* inspissated juice of Conium *fifteen grains.* Mix, and divide into twenty pills, of which one pill may be given every hour or two, until the effects of the Conium have commenced, after which give one pill every four or five hours, according to its influence. In consequence of the action of Conium on the spinal marrow it lessens the venereal appetite. It likewise lessens the secretion of milk. In the neuralgic pains attending carcinomatous affections it usually gives relief; sometimes, however, it has exerted no influence whatever, in palliating them. In scrofula, gôitre, and indeed in all tuberculous affections, it will be found very effectual given in combination with the iodide of iron. It enters into the Compound Plaster of Belladonna, an excellent preparation, which I have been in the habit of using for many years. The leaves have likewise been employed externally as a poultice to painful tumors, ulcers, neuralgic and rheumatic pains, etc. The aqueous extract of this plant is worthless; the inspissated juice, or the ethereal extract, are alone valuable. A strong solution of the inspissated juice, or the juice of the fresh leaves, coated over the parts daily, for five or six days, will cure the itch. Dose of the leaves and inspissated juice, from one to three grains, three or four times a day; of the ethereal extract, which is an elegant extract of a rich dark-green color, from one-eighth of a grain to one-half of a grain. Conia, the active principle, is not used in medicine. Dr. Reid gives the following formula for toothache: Take of Conia *one drop;* Rectified Alcohol, Essence of Cinnamon, each *four drops.* Mix. This is applied by means of a camel's hair pencil. It relieves the pain instantly, but produces no effect where the nerve is not exposed by caries; a few minutes after its application there will be vertigo, difficulty of swallowing, etc., which usually cease in about ten or twenty minutes. It should not be too frequently, nor too largely applied.

The *Cicuta Maculata,* Water Hemlock, is seldom used, being superseded by the Conium, which is deemed the safer article.

Off. Prep.—Extractum Conii Alcoholicum; Emplastrum Belladonnæ Compositum; Unguentum Conii.

CONVALLARIA MULTIFLORA. (*Polygonatum Multiflorum. Desfontaines.*)

Giant Solomon's Seal.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—This plant has a perennial *root* with a terete, recurved, smooth *stem,* growing from one to four feet high; the *leaves* alternate, distichous, lanceolate, amplexicaul, smooth and glossy above, paler and generally pubescent beneath, from two and a half to six inches long, by one to two and a half broad. *Flowers* five to eight lines long, pendulous, greenish-white, subcylindric. *Peduncles* axillary, filiform, branching, scarcely a fifth as long as the leaves, and from one to six flowered. *Berry* globose, three-celled, dark-blue or blackish when ripe; *cells* two-seeded. —*W.*

CONVALLARIA RACEMOSA, the *Smilacina Racemosa* of Desfontaines, has a thick rhizoma, sweet to the taste, with a *stem* from one to two feet high, downy, and recurved at the top. The *leaves* are from four to six inches long, and about one-third as broad, oval, acuminate, veined, minutely pubescent, on petioles not exceeding two lines in length, and often sessile. The *flowers* are very numerous, small, white, on white pedicels, and with white, exserted, tapering filaments, constituting a large, compound, terminal raceme. *Berry* three-celled, pale-red, speckled with purple, aromatic.—*W. G.*

History.—These plants grow on the sides of meadows, high banks, woods, and mountains, in various parts of the United States, especially in the Northern and Eastern States, and Canada, and are in blossom from May to August. The roots, which are the officinal parts, are inodorous, but of a mucilaginous, somewhat sweetish taste, followed by a faint sense of bitterness. There are several varieties of this plant, some of which have been transferred to other families, as Smilacina, and Polygonatum, but the roots of which, probably, possess similar medical virtues. Although used with much benefit in several diseases by many physicians, yet this plant has received but little attention as to its true therapeutical, as well as physical characteristics.

Properties and Uses.—Tonic, mucilaginous, and mildly astringent. Found of much value in leucorrhea, menorrhagia, female debility, and pectoral affections. In piles, the root chewed and swallowed, or a decoction drank as freely as the stomach will bear, will be found to give prompt relief, or the root may be applied to the part, with a similar result. An infusion of the root will be found of great efficacy in irritable conditions of the intestines, as well as in chronic inflammations of these parts, especially when attended with burning sensations, pain, etc. In erysipelas, and cutaneous affections of an erysipelatous nature, as well as those maladies of the skin produced by the poison-vine, or resulting from the poisonous exhalations of other plants, the decoction of Solomon's Seal Root will afford direct relief, and an ultimate cure; it may also be applied externally, with advantage, to local inflammations. A large dose of the decoction will often provoke emesis or nausea, and act as a cathartic. Dose of the decoction, from one to four ounces, three times daily. Solomon's Seal four ounces, water two pints, molasses one pint, simmered down to one pint, then strained, and evaporated to the consistence of a thick fluid extract, and one ounce, or half an ounce of powdered rosin, mixed with it, forms an excellent remedy for piles, in doses of a teaspoonful several times a day.

Off. Prep.—Decoctum Convallariæ; Vinum Symphyti Compositum.

CONVOLVULUS PANDURATUS.

Wild Potato.

Nat. Ord.—Convolvulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—This plant, likewise known as *Wild Jalap*, *Man in the Ground*, *Mechameck*, *Man of the Earth*, etc., has a perennial, very large, tapering *root*, with several *stems* from the same root, from four to eight feet long, round, slender, purplish, smooth or nearly so, trailing or twining. The *leaves* are two or three inches long, and about the same width, broadly cordate at base, acuminate, entire, or wavy, alternate, sometimes panduriform, smooth, deep-green above, paler beneath, and on long petioles. The *flowers* are white, dull purple toward the base, large, opening in the forenoon; *peduncles* axillary, longer than the petioles, cymose, branching at the top, several-flowered. *Corolla* large, campanulate, two or three inches long. *Calyx* smooth, five-parted, naked; *sepals* ovate-oblong. *Stamens* white, the length of the tube; *anthers* oblong. *Style* white, threadlike; *stigma* capitate, bilobed. *Capsule* oblong, two-celled, four-seeded, and without intermediate partitions.—*L.*—*W.*—*G.*

History.—Wild Potato is indigenous to the United States, growing in light and sandy soils, from Connecticut and West New York, southward and westward, and flowering from June to August; it rarely grows north, but is found in some parts of South America. The root is the officinal part; it is very large, being from two to eight feet in length, and from two to four or five inches in diameter, branched at the bottom, brownish-yellow externally, whitish and lactescent internally, furrowed lengthwise, of a disagreeable odor, and bitter, rather acrid taste; about seventy-five per cent. in weight is lost by drying it. It is generally met with in transverse circular sections, which are somewhat tawny externally, whitish, with diverging lines internally, and not readily powdered; the powder is somewhat grayish. Water or alcohol extracts its active properties, but diluted alcohol or spirits are its best solvents. It contains resin, bitter-extractive, starch, gum, gallic acid, etc. Probably the active principle of this plant would prove more energetic than the crude root, and become a valuable agent.

Properties and Uses.—The real properties of this plant are unknown. It possesses mild cathartic properties, acting gently in doses of from forty to sixty grains of the powdered root. The infusion, taken in wine-glassful doses every hour, has been effectual in dropsy, strangury and calculous affections. It seems to exert an influence over the lungs, liver, and kidneys, without excessive diuresis or catharsis. The saturated tincture is more energetic than the powdered root, decoction, or extract. It is asserted that the Indians can handle rattlesnakes with impunity, after wetting their hands with the milky juice of this root.

CONVOLVULUS SCAMMONIA.

Scammony.

Nat. Ord.—Convolvulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE CONCRETE JUICE OF THE ROOT—GUM RESIN.

Description.—This plant has a perennial, fleshy, fusiform *root*, from three to five feet long, and from three to five inches in diameter, branched toward the lower end, with a grayish bark, and abounding in an acrid, milky juice. The *stems* are annual, numerous, slender, round, smooth, branching, twining, very slightly angular near the ends, and growing from twelve to twenty feet upon the soil, or on adjacent plants. The *leaves* are on long petioles, alternate, sagittate, oblong, acute, entire, quite smooth, truncate and angular at the base, with acute spreading lobes, and of a bright-green color. The *flowers* are on axillary, solitary, three-flowered peduncles, scarcely twice so long as the leaves. *Sepals* five, rather lax, smooth, ovate, repand, obtuse with a reflexed point, colored at the edge. *Corolla* funnel-shaped, very much expanded, pale, sulphur-yellow, thrice as long as the calyx, an inch or more in length; limb entire, somewhat reflexed. *Stamens* five, erect, converging, thrice as short as the corolla. *Ovary* two-celled, four-seeded, supporting a slender style as long as the stamens, with two linear-cylindrical, erect, oblong, parallel, distant and white stigmas. *Capsule* two-celled; *seeds* small, pyramid-shaped.—*L.*

History.—Scammony plant is a native of Turkey, Syria, Greece, Persia, etc., and somewhat resembles the Convolvulus Panduratus. The officinal portion is the concrete juice of the root, the other parts of the plant yielding no milky juice whatever. It is collected in the month of June, the root being cut across, obliquely, near its crown, and shells fixed beneath, into which the milky juice gradually flows. This soon concretes under exposure to the air and evaporation, forming the gum-resin of commerce, Scammony; of which but a few drachms are obtained from a single root. It is seldom had in a pure state, being more or less adulterated with flour, ashes, meal, chalk, sand, etc. It is imported directly from Smyrna, or from some of the Mediterranean ports. There were several varieties of Scammony formerly known, as the Aleppo, Smyrna, and Montpelier, of which the first-named was the best, but, owing to the adulteration of the drug, it is impossible to keep up these distinctions any longer, and consequently the article is now recognized as *genuine* or *factitious* Scammony.

Pure or Virgin Scammony, contains but a small proportion of gum. It is in irregular lumps of various sizes, compact, light, very brittle, readily pulverizable, with a somewhat conchoidal, glossy, resinous, greenish-black fracture, soon becoming darker, and presenting small air-cavities and translucent fragments of a grayish color, when examined by a magnifying glass. Its odor is strong, peculiar, cheesy, and its taste is slight, but it subsequently produces a faint acridity in the back of the throat. Its powder is of a whitish or light-gray color. The whitish gray powder which covers some of the pieces, effervesces with hydrochloric acid. It is nearly wholly soluble in boiling alcohol, and sulphuric ether takes up from 77 to 83 per cent. of it. With water it forms a smooth emulsion, which is not permanent. Alcohol, however, is its best solvent. Analysis has detected in it a large proportion of resin, from 77 to 83 per cent., and small quantities of gum, fiber, sand, starch and water; the starch is an accidental ingredient, probably derived from the root.

As met with in the shops, Scammony is in compressed circular cakes, having two flattish surfaces, or one surface convex, about six or seven inches in diameter, from six to twelve lines, or more thick, of a dark ash-gray color, paler on a freshly fractured surface, but becoming darker on exposure to the air, and having a taste and odor similar to that of the genuine article; it is easily pulverized, forming a light-gray powder, and when triturated with water gives a milky emulsion of a greenish hue. These cakes are often broken and met with in pieces, having a slightly lustrous, uneven surface, compact, with a minutely foraminous texture, and sometimes semi-transparent at their margins. This sort of Scammony is always more or less adulterated with carbonate of lime, guaiacum, cow-dung, starch, etc.

At Montpelier, in Southern France, factitious Scammony is manufactured to a great extent, being prepared from the expressed juice of *Cynanchum Monspeliacum*, mixed with various cathartics and resins. It has been bought for Smyrna Scammony. It occurs in cakes somewhat similar to the ordinary cakes of commercial Scammony, not quite so large, much darker than the genuine article, of a disagreeably bitter taste, and an odor resembling balsam of Peru. It is more irritating and less purgative than the true varieties.—*P.* There are several other kinds of Scammony occasionally met with, but which may be detected by the proper tests.

Pure Scammony may be known by being light, of a glistening almost resinous fracture if it be old and dry, friable, always of a brownish-gray color, and not subject to the results of the tests given below for detecting its adulterations. Sulphuric ether separates at least eighty per cent. of resin dried at 280°.

Pure Scammony may be obtained by boiling the finely-powdered article of commerce in successive portions of proof-spirit, till the spirit ceases to dissolve any thing; filter, and distill the liquid until little but water passes over. Then pour away the watery solution from the resin at the bottom; agitate the resin with successive portions of boiling water till it is well washed, and finally dry it at a temperature not exceeding 240°. This separates the active matter of Scammony from its impurities, and is called the *Extract of Scammony*. It forms with milk not skimmed, an emulsion scarcely distinguished from good milk itself.

The addition of *carbonate of lime* as an adulteration, may be detected by its effervescing with muriatic acid: *starch*, may be known by the tincture of iodine forming a blue precipitate with an aqueous solution of the drug; *guaiacum*, may be detected by an application of some of the tincture of the suspected article on the fresh-cut surface of a raw potato; if guaiacum be present, it turns it quickly to a bright blue color.

Colophony may be detected in the resin of Scammony, by the oil of turpentine, which dissolves it at common temperatures, leaving the Scammony resin almost wholly unacted upon. But the best reagent for this purpose is sulphuric acid, which possesses the property of dissolving many resins, and of modifying, more or less, their composition. If a little of this acid be poured over colophony, it *immediately*, and by simple contact, develops an intense red color. The same acid, when poured over pure resin of Scammony, produces, on the contrary, no immediate change; it is only, after the lapse of some minutes, and with contact of the air, that it becomes colored, and then but slightly, the color being wine dregs. For this purpose, four or five grains of the resin may be placed into a glass or porcelain mortar, and sixty or eighty grains of the sulphuric acid of commerce added. Upon rubbing it with the pestle, it will become red at once, if colophony be present. This method will detect the one-twentieth part of the adulteration.

Properties and Uses.—Scammony is a powerful, drastic cathartic, operating with harshness and griping. It was a favorite internal and external remedy with the Arabians. It does not appear to be poisonous even in large doses, but is seldom used alone, except in cases where a powerful impression upon the bowels is desired; most commonly it is combined with other cathartics, whose action it augments, while its own virulence is diminished. Scammony is usually given in the form of an emulsion with sugar or sweet almonds. But when triturated with milk it is considered a superior preparation, as follows: Seven grains of pure Scammony to be gradually triturated with three ounces of unskimmed milk, to which a few grains of ginger may be added, forms a safe purgative. Another form of using this gum-resin, is that of biscuit. A paste is made of Scammony one drachm; Venice soap five grains; sugar nine grains; biscuit in powder one ounce, and a few drops of water. Mix together, divide into two biscuits, and let them dry; one biscuit acts energetically. The dose of powdered Scammony is from three to twelve grains; of the pure resin, one-half this quantity. Its use is always contra-indicated by intestinal inflammation.

Off. Prep.—Pilulæ Podophyllini Compositæ. Pilulæ Gambogiæ Compositæ.

COPAIFERA OFFICINALIS.

Officinal Copaiva-tree.

Nat. Ord.—Fabaceæ, *Jussieu*, or Amyridaceæ, *Lindley*. *Sex. Syst.*—Decandria Monogynia.

THE OLEO-RESINOUS JUICE.

Description.—Copaifera Officinalis, the *Copaifera Jacquini*, of Desfontaines, is a tall and handsome tree, with many small, crooked branches at the summit, and a grayish-brown bark. The *leaves* are large, alternate, generally equally pinnated; the *leaflets* are in pairs of from two to five, incurved, ovate, unequal sided, obtusely acuminate with pellucid dots; *petioles* short. The *flowers* are white, subsessile, in compound axillary and terminal spikes. *Calyx* four-parted; *segments* oblong, concave, diverging, the lowest the narrowest; *stamens* ten, thread-like, declinate. *Ovary* roundish, compressed, with two ovules. *Fruit* pedicellate, oblique, obovate, rounded, compressed, between woody and leathery, two-valved, one-seeded; *seeds* elliptical, inclosed in a one-sided aril.—*L.*

History.—There are several species of the Copaiba tree, which furnish the oleo-resin copaiba. For a long time it was supposed to be the product of but one tree, but the examinations of Martius, Hayne, and others, have shown that there are many species, and that, probably, several of them contribute to furnish the Copaiba of commerce. Beside the one described above, are the *C. Guaianensis*, *C. Langsdorffii*, *C. Coriacea*, *C. Beyrichii*, *C. Martii*, *C. Bijuga*, *C. Nitida*, *C. Laxa*, *C. Cordifolia*, *C. Jussieui*, *C. Sellowii*, *C. Oblongifolia*, and *C. Multijuga*. These trees are all peculiar to South America, growing in Brazil, the West Indies, and other parts. It is principally collected in the provinces of Para and Maranham, in Brazil, the trees of which yield the finer qualities of juice. It is imported from Para, and other Brazilian ports, Carthagena, Maracaibo, etc., each port giving a different quality of balsam. The juice is obtained by deep incisions being made into the trunk or stems of the trees, during or immediately following the wet season; the balsam flows freely, being clear, transparent and fluid, but soon becoming thick and pale-yellowish. The incisions either heal spontaneously, or are closed with either wax or clay. Sometimes the operation is performed two or more times annually, and some trees so abound in the juice as to yield twelve pounds in three hours. Although Copaiba differs much in its appearance, owing to its various botanical sources, yet but two kinds are usually distinguished in commerce, the Brazil and the West Indian.

The *Brazil Copaiba*, which is the most common in use, is a clear, transparent fluid, rather thinner in consistence than new honey, of a pale wine-yellow color, of a peculiar, resinous, not unpleasant odor, and of a bitter, nauseous, somewhat acrid, aromatic, persistent taste. Its specific gravity varies from 950 to 1,000. When long kept, it becomes darker, more dense, and of greater consistency; and after some years its resin partly crystallizes in minute six-sided prisms. Water does not dissolve Copaiba, but acquires its odor; it is moderately soluble in rectified spirit, and freely so in alcohol, fixed and volatile oils, and sulphuric ether. With the aid of heat it dissolves iodine and sulphur; sulphuric acid unites with it, rendering it reddish brown and thicker. Solution of potassa forms a soap with it; magnesia, and its carbonate are freely dissolved by it, especially with the aid of heat, producing a honey-like translucent mass which gradually hardens; carbonic acid is disengaged by heat. Hydrate of lime causes a similar change. It is composed of volatile oil, resin, and a minute proportion of acid.

The *West Indian Copaiba* is of a thicker consistence than the above, likewise of a darker yellow color, turbid but translucent, of a less agreeable and more terebinthinate odor, and more bitter and acrid in taste. Neither of these varieties contain benzoic acid: hence the term *balsam*, as applied to Copaiba, is incorrect.

The *volatile oil* constitutes from one-fourth to one-half or more of the Copaiba, and is obtained by distillation. (See *Oleum Copaibæ.*) The *resinous matter* which remains after the oil has been separated, becomes hard and brittle in cold, but continues soft in warm weather. It is translucent, greenish-brown, nearly inodorous and tasteless. It consists of a large proportion, 51 to 54 per cent., of a yellowish, brittle resin, soluble in naphtha, alcohol, ether, fixed and volatile oils, bisulphuret of carbon, and forming bases with alkalies (*copaivic acid*); and of a small amount, 2 to 11 per cent, of a soft, brownish resin, unctuous, insoluble in cold naphtha, but readily soluble in ether or absolute alcohol, and having no affinity for the salifiable bases.

Copaiba, especially in the European markets, is often adulterated with oil of turpentine, or fixed oils. If turpentine, or other volatile oil be present even in small proportion, it may be detected by its odor on the application of gentle heat. Any fixed oil, except castor-oil, may be discovered by agitation with absolute alcohol, giving a turbid, instead of a clear and permanent solution, from which the impurity slowly separates. Carbonate of magnesia added to the suspected article, and a gentle heat applied, is a better test for all fixed oils. Pure Copaiba dissolves one-fourth of its weight of the carbonate, and remains translucent; but a small proportion of any fixed oil renders the product opaque.

The presence of castor-oil in Copaiba, may be detected in several ways, one is to add one part of the balsam to one hundred and twenty or one hundred and thirty parts of water, and boil the mixture, continuing the heat until complete evaporation has ensued, which will leave the hard resin behind if the Copaiba be pure; but if a fixed oil be present, the resin will be of a degree of softness proportioned to the amount of the adulteration. M. Planche advises to agitate in a glass tube one part liquor of ammonia, sp. gr. 0.965, with two or three parts of the balsam; if this be pure, the compound becomes clear and transparent in a few instants, otherwise it becomes non-transparent. This test, however, is said to be not reliable in every instance.—*Am. Jour. Pharm. XVI.*, 236. Three parts of Copaiba mixed with one part of sulphuric acid, forms a plastic and reddish mass; but castor-oil, when thus mixed, only becomes of the consistence of turpentine, and is not colored. All these tests, however, when taken singly, are open to sources of error, and the best method of determining the purity of the article is to distill the Copaiba, and note the amount of essential oil obtained.—*C.* M. Guibort states that a Copaiba which possesses the following four properties is to be preferred to all others: 1st. Of being entirely soluble in two parts of absolute alcohol; 2nd. Of forming at 60° F. a transparent mixture with two-fifths its weight of a strong solution of ammonia; 3rd. Of solidifying with one-sixteenth its weight of calcined magnesia; 4th. Of producing a dry and brittle resin, after prolonged boiling with water. The last character is an indispensable complement to the three first, which alone are not sufficient to certify the purity of the balsam. On the other hand, one or two of the first characters may be wanting, without necessarily involving the adulteration of the drug. When they are wanting, we must try to detect some foreign substance, perhaps, peculiar to the tree from which the variety of Copaiba was procured. According to an analysis by Gerber, Copaiba gave volatile oil 41, yellow dark resin 51.38, brown soft resin 2.18, water 5.44; old balsam gave volatile oil 31.70, yellow hard resin 53.68, brown soft resin 11.15, water 4.10.—*T.*

Properties and Uses.—When given in large doses, Copaiba is an irritant; in medicinal doses it is stimulant, cathartic, and diuretic; it likewise exerts an especial influence on the mucous tissues of the system, diminishing their secretions when excessive, and for this latter purpose it is principally employed. Taken internally, it causes warmth in the gastric region, with unpleasant eructations, and sometimes nausea, or even emesis. Its continued use impairs the digestive functions, unless in very small doses. In the course of its action it becomes absorbed, so that its odor and bitter taste are communicated to the urine, while the former can also be observed in the respiration. Among the inconveniences attending its use, especially in large doses, the most frequent are sickness at stomach, emesis, hematuria, catharsis, and febrile symptoms; these effects may be obviated very often, by administering the remedy more frequently, but in smaller doses, and by combining it with cinnamon, nutmeg, or some other aromatic. At times, it produces a transient, papular, cutaneous affection, like the eruption of rubeola, and which is accompanied with an unpleasant formication or itching. It has been found most beneficial in chronic mucous affections, as in chronic gonorrhea, bronchitis, irritable conditions of the bladder, gleet, leucorrhea, chronic catarrh, chronic diarrhea and dysentery, and obstinate piles. Its effects in gonorrhea are much improved by the addition of liquor potassa; and it is much more beneficial in the gonorrhea of males than of females, because, in the latter, the vagina is oftener affected than the urethra. However, the recent improvements in the treatment of gonorrhea render the disease readily curable, Copaiba being rarely, if ever, required to effect the cure. In injection, it has been used with good results; make an emulsion of two drachms of Copaiba with the yolk of an egg, add twenty or thirty drops of laudanum to it, in order to prevent its too speedy discharge from the rectum, and eight fluidounces of water. This may be used as an injection, and repeated three or four times a day. Locally, it forms an excellent application to chilblains, old ulcers, and fistulous ulcers, in which it serves to speedily soften the callosity of the walls of the fistulous canal. The dose of Copaiba is from twenty to sixty drops, two or three times a day. It may be taken in emulsion, made by triturating each dose with the yolk of one egg, adding half an ounce of mint, cinnamon, or other aromatic water, and sweetening with sugar; or it may be taken in the form of pill with magnesia; the best and least objectionable form in which it can be taken is in the form of capsules. (*See Article "Glue"*) The oil is the best form for obtaining the effects of the Copaiba, *which see.*

Off. Prep.—Mistura Copaibæ Composita; Oleum Copaibæ; Pilulæ Copaibæ Compositæ; Pilulæ Copaibæ.

COPTIS TRIFOLIA.

Goldthread.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE ROOT.

Description.—This plant, also termed *Mouthroot*, has a small and creeping, perennial root, of a bright-yellow color; the *stems* are round, slender, and invested at the base with a number of ovate, acuminate, yellowish scales. The *leaves* are ternate, on long, slender petioles, evergreen; *leaflets* roundish, acute at base, lobed and crenate, smooth, firm, veiny, sessile, four to eight lines long; the crenatures acuminate. *Scape* slender, round, bearing one small, starry, white flower, and a minute, ovate, acute bract at some distance below. *Petals* five, six, or seven, inversely conical, hollow, yellow at the mouth. *Sepals* five, six, or seven, oblong, concave, white. The *stamens* are numerous, white, with capillary filaments, and adnate, roundish anthers. The *ovaries* are from five to seven, stipitate, oblong, compressed; *styles* short and recurved; *stigmas* acute. *Capsules* stalked, oblong, rostrate, compressed, diverging stellately, and containing many small, black, oval seeds.—*L.*—*W.*

History.—Goldthread is found growing in the northern parts of the United States, and in Canada, Greenland, Iceland, and Siberia; it grows in dark swamps and sphagnous woods, flowering from early in the spring to July. The root, as found in the shops, is in parcels, composed of long, entangled, golden-yellow, brittle, filamentous fibers, frequently containing the stem and other parts of the plant, and of a bitter taste, but no odor. Autumn is the season for collecting them, when they should be dried with care. Its properties are imparted to water, but more perfectly to alcohol, and the solutions are precipitated by nitrate of silver, and acetate of lead. It does not appear to contain resin, gum, or tannin, its virtues depending, probably, on a bitter extractive substance.

Properties and Uses.—Goldthread is a pure and powerful bitter tonic, somewhat like quassia, gentian, and colombo, without any astringency. It may be beneficially used in all cases where a bitter tonic is required, and is decidedly efficacious, as a wash or gargle, when in decoction, in various ulcerations of the mouth. In dyspepsia, and in chronic inflammation of the stomach, equal parts of goldthread and golden-seal, made into a decoction, with elixir vitriol added in proper quantity, will not only prove effectual, but in many instances of the latter kind, will permanently destroy the appetite for alcoholic beverages. Dose of the powder, or tincture from half a drachm to a drachm; of the decoction, from two to six fluidrachms; the tincture, made by adding an ounce of the powdered root to a pint of diluted alcohol, is preferable to the powder.

Off. Prep.—Decoctum Coptis.

CORALLORHIZA ODONTORHIZA.

Crawley.

Nat. Ord.—Orchidaceæ. *Sex. Syst.*—Gynandria Monandria.

THE ROOT.

Description.—This plant, also known by the various names of *Dragon's claw*, *Coral-root*, etc., is a singular, leafless plant, with much-branched and toothed coral-like rootstocks. The *root* is a collection of small, fleshy tubers, articulated and branched much like coral. The *scape* is from nine to fourteen inches high, rather fleshy, striate, smooth, invested with a few long, purplish-brown sheaths. The *flowers* are from ten to twenty, ringent, in a long spike, of a brownish-green color; the *lip* is white, generally with purple spots, undivided, oval, obtuse, crenulated: *spur* obsolete, adnate to the globular ovary; *anther* two-lipped, terminal; *pollen-masses* four, obliquely incumbent. *Capsule* large, reflexed, strongly ribbed, oblong, or subglobose.—*G.*—*W.*

History.—This plant is indigenous to the United States, growing in rich woods, about the roots of trees, from Maine to Florida and westward, flowering from July to October. The varieties *C. Multiflora*, *C. Wistariana*, *C. Verna*, *C. Innàta*, probably possess similar medicinal virtues. By some this plant is supposed to be parasitic on the roots of certain trees. It was first discovered, in 1816, by Dr. D. S. C. H. Smith, although long known previous to that time to herbalists. The entire plant is destitute of verdure. The root is the officinal part, it is small, dark-brown, resembling cloves or a hen's claw, has a strong, nitrous smell, and a mucilaginous, slightly-bitter, astringent taste. It has not been analyzed, hence its proper menstruums are unknown. The dried root, as met with in the shops, is composed of small, coral-like pieces, about two lines in diameter, and from three to twelve lines long, the longest pieces consisting of the small coral-like branches, round or compressed, crooked, wrinkled lengthwise, more or less distinctly annulated at distances varying from one to two lines, dark-brown externally, and lighter within. Its fracture is short, presenting under the microscope a shining, pulverulent or granular appearance, somewhat like the saccharine frost on figs and raisins. They are inodorous, with a taste sweetish at first, somewhat resembling that of raisin-seed, and succeeded by a faintly bitterish, mucilaginous flavor.

Properties and Uses.—Crawley is, probably, the most powerful, prompt, and certain diaphoretic in the Materia Medica, but its scarcity and high price prevent it from coming into general use. It is also sedative, and promotes perspiration, without producing any excitement in the system. Its chief value is as a diaphoretic in fevers, especially typhus, and in inflammatory diseases; it has proved efficacious in acute erysipelas, cramps, flatulency, pleurisy, and night-sweats; and relieves hectic fever without debilitating the patient. Probably it will be found to combine tonic, sedative, diaphoretic, and febrifuge properties. Its virtues are especially marked in the low stage of fevers. The dose is from twenty to thirty grains of the powdered root, given in water as warm as the patient can drink, and repeated every hour or two, according to circumstances. The powder should always be kept in well-closed vials; it constitutes the "*fever-powders*" of some practitioners. Combined with caulophyllin it forms an excellent agent in amenorrhea and dysmenorrhea; and is unsurpassed in after-pains, suppression of lochia, and the febrile symptoms which sometimes occur at the parturient period. In fevers it may be advantageously combined with leptandrin, or podophyllin, where it is found necessary to act upon the bowels or liver; and mixed with dioscorein, it will be found almost a specific in flatulent and bilious colic. This plant has not been recognized in the standard works on Materia Medica, but deserves more attention than has been bestowed upon it. There is some doubt, however, as to the true plant which furnishes the Crawley root, and in my first edition I described it as the *Pterospora Andromeda*, but from what I have learned since, I am convinced it is a *Corallorhiza*. In many respects these plants resemble each other, as will be seen by the following description of the PTEROSPORA ANDROMEDA, or Albany Beech drops. It belongs to the *nat. ord.*, Ericaceæ; *sub order*, Monotropeæ; *sex. syst.* Decandria Monogynia. It is a rare and singular plant, found on barren hills and shady uplands, and in a hard, clay soil, in the State of New York, and some of the Northern States and Canada, flowering in July. It has a perennial, fleshy, tuberculous *root*, with many *tubers* which resemble the claws of a fowl. The *stem* or *scape* is erect, simple, straight, dark-purple, cylindrical, covered with short viscid wool, from eight to thirty inches in height, leafless, and sparsely beset with scales. *Leaves* none. The *flowers* are pale or reddish-white, lateral, nodding, and disposed in a terminal raceme from six to twelve inches long, and composed of fifty or more flowers; the *pedicels* are irregularly scattered, from six to eight lines in length, and axillary to long linear bracts. The *calyx* is five-parted; the *corolla* is roundish-ovoid, urn-shaped, the limb five-toothed, reflexed, and inclosing the stamens. *Stamens* ten; *filaments* flat; *anthers* peltate, two-celled, two-awned, opening lengthwise; *style* short; *stigma* five-lobed, capitate. *Capsules* or *pod* globose, depressed, five-lobed, five-celled, loculicidal. *Seeds* very numerous, minute, ovoid, tapering to each end, the apex expanded into a broad, reticulated wing, many times larger than the nucleus.—*G.*—*W.*

CORIANDRUM SATIVUM.

Coriander.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE FRUIT.

Description.—Coriander is an annual, smooth herb, with a tapering *root*, and a round, erect *stem*, twelve or eighteen inches high, more or less branched, leafy, round, and striated. The *leaves* are compound; the lower ones pinnate, on long, slender petioles, their leaflets wedge-shaped, or fan-shaped, and acutely notched; upper-leaves multifid, in fine, linear segments. The *flowers* are white, often with a reddish tint, and are disposed in compound, terminal, stalked umbels, of rarely more than four or five rays; the partial rays more numerous. *Calyx* five-toothed, acute, unequal, permanent. *Petals* obovate, emarginate, with inflexed lobes, the exterior radiating and bifid. The *fruit* is spherical, a line and a half in diameter, somewhat coriaceous, carminative, and aromatic. *Seed* excavated in front, with a loose skin.—*L.*

History.—Coriander is an Italian plant, but introduced in all the warmer portions of Europe, flowering from May to July, and maturing its fruit early in the latter part of summer. When the fresh plant is bruised, it emits a disagreeable, bug-like odor, but by desiccation the fruit acquires its peculiar aromatic odor. The pleasant flavor is owing to a volatile oil, which may be procured by distillation. The fruit, or seeds, are spherical, about two lines in diameter, of a grayish-yellow color, finely ribbed, and consist of two hemispherical mericarps, adhering by their concave surfaces. Alcohol takes up their active properties; water only partially.

Properties and Uses.—Coriander is a stimulant and carminative, and is employed in medicine as an adjuvant or corrigent. Its dose is from twenty to sixty grains.

Off. Prep.—Confectio Sennæ.

CORNU CERVINÆ USTUM.

Burned Deer's Horn.

Preparation.—Take the horns of the deer—*Cervus Virginianus*—any time from the months of August to December, or while they are *in velvet* (until just before they fall off), and when dry rasp them to a coarse powder. Place this in an iron vessel, cover it up tightly, and put it in an oven, or other situation, where a heat, not equal to boiling water, say 195° or 200°, can be continuously maintained for forty-eight hours, or until the whole becomes of a light-brown color, like roasted coffee, and is readily pulverizable, then, when cool, pulverize it, and keep it in well-stopped bottles. During the application of the heat, which should be gradual, the powder should be constantly agitated, on which account, a vessel similar to a coffee-roaster would be a very suitable one in which to burn it. The powder, thus prepared, is of a light chocolate, or yellowish-brown color, of a peculiar, slightly aromatic, animal charcoal odor, and a very faintly-astringent taste. Horns which have fallen from the deer will not answer.

Properties and Uses.—A powerful styptic. Especially an American remedy, of much value in uterine hemorrhage and menorrhagia. Has also been found beneficial in dysentery, hemoptysis and other hemorrhages. Dose of the powder one drachm every half-hour until the hemorrhage ceases permanently, which is usually from the first to the third or fourth dose; or one drachm of the powder may be placed in a gill of hot water, and a tablespoonful of the infusion be given every five or ten minutes. This has been tested in numerous cases, and as yet, no failure has been heard of. It is often given combined with the compound powder of ipecacuanha and opium, or with other agents, as capsicum and opium, etc.

CORNUS CIRCINATA.

Round-leaved Dogwood.

Nat. Ord.—Cornaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—This plant, likewise called *Broad-leaved Dogwood*, *Alder-leaved Dogwood*, *Round-leaved Cornel*, etc., is a shrub growing from six to ten feet high, with straight, slender, greenish and verrucose *branches*. The *leaves* are large, about as broad as long, orbicular, or very broadly oval, opposite, acuminate, waved on their edges, somewhat rough above, but downy beneath. The *flowers* are white, in small, spreading, depressed cymes, without an involucrum. The *fruit* or *berries* are a bright blue, becoming lighter colored as they ripen, small, soft, hollowed at base, and crowned with the persistent style.—*W.*—*G.*

History.—This plant is found in North America from Canada to the Carolinas, and west to Missouri, growing on river banks, copses, and elevated ridges, and flowering from May to August. The dried bark is usually in grayish-white, cylindrical, or semi-cylindrical pieces, having a slight odor, and a somewhat aromatic, astringent, and bitterish taste. It imparts its virtues to water, and in chemical character, has thus far been found similar to the Cornus Florida.

Properties and Uses.—An astringent tonic, which may be employed in all cases where such agents are indicated. An infusion of it may be made by infusing an ounce of the coarsely-powdered bark in a pint of boiling water, and may be given in doses of one or two fluidounces, several times a day; it is useful in diarrhea and dysentery, and also as a gargle in sore-throat. One ounce of the bark affords 150 grains of an astringent, intensely bitter extract, which may be used with benefit. The medical virtues of this plant are similar to those of the Cornus Florida, as well as its doses.

CORNUS FLORIDA.

Dogwood.

Nat. Ord.—Cornaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—This plant, also known as *Boxwood*, *Flowering Cornel*, etc., is a small indigenous tree, from twelve to thirty feet high, with a very hard and compact wood, covered with a rough, brownish bark, much broken. It is a tree of tardy growth. The *branches* are opposite, spreading, smooth, covered with a reddish bark, and marked with rings at the place of the former leaves. The *leaves* are opposite, but partially expanded at the flowering time, ovate, acute, entire, petiolate, nearly smooth, dark-green and grooved above, paler beneath and marked with strong parallel veins. The *flowers* are very small, of a greenish-yellow color, in heads or sessile umbels, upon peduncles an inch or more in length, surrounded by a large involucre, constituting the chief beauty of the tree when in flower. *Involucre* composed of four white, nerved, obovate leaves, having their point turned abruptly down or up, so as to give them an obcordate appearance. *Calyx* superior, campanulate, with four obtuse, spreading teeth. The *corolla* is composed of four oblong, obtuse, reflexed petals. *Stamens* four, erect; *anthers* oblong, with the filaments inserted in their middle. *Style* shorter than the stamens, erect, bearing an obtuse stigma. *Fruit* an oval drupe of a glossy scarlet color, containing a nut or nucleus with two cells and two seeds.—*L.*—*W.*

History.—Cornus Florida grows in various parts of the United States, but more abundantly in the Middle States; it flowers in April and May, sometimes earlier and sometimes later than this, depending upon the climate; the fruit matures in autumn. The wood is very compact and hard, and capable of receiving a high polish, and may be employed for many purposes. The bark of the stem, branches, and root, is the officinal part;

that from the root is the best. It is found in the shops in broken fragments, somewhat quilled, one-fourth or one-sixth of an inch in thickness, ash-colored with a reddish tinge, very friable, and very readily reduced to a powder of a similar color; its odor is scarcely perceptible, and its taste is amarous, with some astringency and a feeble aroma. Its properties are taken up by water or alcohol. Walker found it to contain tannic and gallic acids, resin, gum, and extractive. More recently Mr. Cockburn has found in it, beside the above, fatty substance, oil, wax, red coloring matter, a crystalline substance, lignin, potassa, lime, magnesia, and iron.—*Am. Jour. Pharm.*, *VII.*, 114.

Mr. W. S. Merrell prepares an article from Dogwood which he terms *Cornine*, and supposes it to be, *probably*, a mixture of resin and insoluble alkaloid. It is prepared by precipitating from the tincture with water, after distilling off the alcohol, in the same manner as podophyllin is prepared. It is a light grayish-brown substance of a peculiar odor, slightly bitter and astringent taste, changed to a dark-brownish red by the action of sulphuric acid, brownish-yellow by nitric acid, and unchanged by muriatic acid. It is insoluble in water, in diluted mineral acids, in volatile oils and spirits of turpentine. Ammonia renders it partially soluble in water; liquor potassa diluted causes a dark wine-colored solution, with a precipitate which dissolves in alcohol, and ether. Chloroform becomes colored by it, the Cornine floating on its surface. Alcohol almost wholly dissolves it, and ammonia renders the solution complete. It is soluble in ether, and ammonia added removes the Cornine in solution, leaving the ether floating clear and transparent. Liquor potassa added to the ethereal solution does not completely remove the Cornine, and causes a precipitate which floats between the two liquids when they separate. An article termed *Cornine* is prepared in New York, but as we have never seen it, nor met with any account of its mode of preparation, we can merely refer to the fact, with this remark, that no practitioner should use any agent whatever, the mode of preparing which is kept a secret from the profession; as well may we employ all the patent medicines so highly lauded by their originators.

Properties and Uses.—Dogwood bark is tonic, astringent, and slightly stimulant; it forms an excellent substitute for Peruvian-bark, having frequently proved efficacious in periodic attacks when the foreign drug failed. It may be used in all cases where quinia is indicated and can not be administered, owing to idiosyncrasy, etc., or where it can not be obtained pure. It may be used with advantage in all cases where tonics are required, in periodical fevers, typhoid fevers, etc. Its internal employment increases the strength and frequency of the pulse, and elevates the temperature of the body. It should be used in the dried state, as the recent bark is apt to derange the stomach, and cause more or less pain in the abdomen, but which may be removed by ten or fifteen drops of laudanum. The *Cornine* prepared by Mr. Merrell is much used as a substitute for quinia, by many, and is frequently preferred by them to the alkaloidal salt. It may be variously combined with xanthoxylin, myricin, salicin, hydrastin, podophyllin, or alcoholic extract of cimicifuga, in the different affections for which it is administered. An extract of the bark prepared by boiling it in water, and evaporating to the proper consistence, will be found the best form in which to administer it. Dose of the powdered bark, from twenty to sixty grains, as often as required; of the extract from five to ten grains; of Cornine from one to ten grains or more. The ripe berries formed into a tincture with brandy or whisky, are a popular bitters among some country families; the flowers are occasionally used in the place of chamomile.

Off. Prep.—Cornine; Decoctum Cornûs Floridæ; Extractum Cornûs Floridæ; Extractum Cornûs Floridæ Fluidum; Pilulæ Quiniæ Compositæ.

CORNUS SERICEA.

Swamp Dogwood.

Nat. Ord.—Cornaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK.

Description.—The Cornus Sericea, known likewise by the names of *Rose-willow*, *Red-osier*, *Silky Cornel*, *Red-willow*, etc., is a shrub from six to ten feet high; the *stems* are several, erect, with a dark-red or purplish bark, and opposite, spreading branches, with downy twigs. The *leaves* are opposite, from two to four inches long, half as wide, ovate, acuminate, varying from ovate and oval to lanceolate, nearly smooth above, with rather prominent veins, with a brown, silky down underneath, and on petioles from half an inch to an inch long. The *flowers* are yellowish-white, small, and disposed in large, terminal, depressed and woolly cymes or corymbs. The *berries* are globose, bright-blue; *stone* compressed.—*L.*—*W.*

History.—Swamp Dogwood is found in moist woods, and on the margins of rivers, from Canada to Carolina, flowering in June and July. The bark is the officinal part, that of the root being preferred; it possesses similar properties with the Cornus Florida.

Properties and Uses.—Similar to the C. Florida, being however more astringent and less bitter. It has been found useful in dyspepsia and diarrhea, and may be employed as a substitute for the C. Florida in the same doses, and administered in a similar manner. An infusion is very valuable in checking vomiting, especially that common to pregnancy and disease of the uterus. It has also been highly recommended in dropsy, ulcers, malignant fevers, and as an antiseptic.

CORYDALIS FORMOSA. (*Dielytra Eximia.*)

Turkey Corn.

Nat. Ord.—Fumariaceæ. *Sex. Syst.*—Diadelphia Pentandria.

THE ROOT.

Description.—This plant, likewise known as *Wild Turkey-pea*, *Stagger-weed*, *Choice Dielytra*, is an indigenous perennial plant, rising from six to ten inches in height, and having a tuberous *root.* The *leaves* are radical, rising from ten to fifteen inches high, somewhat triternate, with incisely pinnatifid segments, but quite variable. The *scape* is naked, and rises from eight to twelve inches in height, with from four to eight cymes, each with from six to ten reddish-purple, nodding *flowers; racemes* compound, the branches cymose; *corolla* from eight to ten lines long, broad at base; *nectaries* or *spurs* very short, obtuse, incurved; *bracts* purplish, at base of pedicels; *style* extended; *stigma*, two-horned at apex; *sepals* two, deciduous; *capsule* pod-shaped, many seeded.—*W.*

History.—This beautiful little plant is now considerably employed in the profession. It flowers very early in the spring, in this section of the country as early as March; and the root or tuber, which is a small round ball, should be collected only while the plant is in flower. It grows in rich soil, on hills, and mountains, among rocks, and old, decayed timber, and is found westward, and south of New York to N. Carolina.

It must be distinguished from the *Corydalis Cucullaria*, which flowers at the same time, and very much resembles it. The root or bulb of the C. formosa, when fresh, is of a darkish-yellow color throughout, while the C. cucullaria has a black cortex or rind, and is white internally. When dried, the external covering of the root is of a light grayish-yellow color, about the fourth of a line thick, inclosing an internal, light-yellow substance; frequently it is of a dark color externally, and when examined under a microscope, full of pores, and internally, yellow or brownish-yellow. It has a faint, peculiar odor, and a taste at first slightly bitter, succeeded by one somewhat penetrating, peculiar and persistent, gently influencing the fauces, and increasing the flow of saliva. The cause of the difference of appearance in drying is not known, unless it be owing to the difference in the age of the root. Microscopic examination of the lighter variety gives a porous, spongy, resinous, glistening fracture; and of the darker, a fracture very much resembling honeycomb. Water or alcohol extracts its virtues. It has not been analyzed, though it contains an alkaloid principle named *Corydalia.* I called the attention of physicians to this principle in a former work, as *corydalin*, not having submitted it to any chemical tests, since which, Mr. W. S. Merrell has manufactured it for the profession, and ascertained its alkaline character. When in powder, corydalia is of a greenish-brown color, insoluble in water, partially soluble in ether, and completely so in alcohol. Diluted muriatic and sulphuric acids dissolve it. Nitric acid reddens it, and it forms crystallizable salts with acetic and sulphuric acids. It is of a peculiar, slightly alöetic odor, of a weak bitter, sub-acrid, and nauseous taste, and rather tenacious. Four pounds of the Corydalis root, yield little more than an ounce of this alkaloid. It is obtained by adding water to the tincture of the root, a portion of the alkaloid is precipitated; filter the supernatant liquid, and add to it ammonia, which causes another precipitate of the alkaloid; again filter the supernatant liquid, and add to it muriatic acid, when the balance of the alkaloid remaining in the solution is precipitated.

The above is the process as given to me by Mr. Merrell, but I can not understand how it can be an alkaloid, and precipitated by an acid. Lowig says that Corydalia is obtained from the hot saturated alcoholic solution in prismatic crystals. The following is M. Wackenroders' process: "Macerate the coarsely powdered root in water some days, which gives a deep red infusion which reddens litmus; filter, and mix it with as much alkali as will render it slightly alkaline. A gray-colored precipitate falls, which is to be collected on a filter. The root is to be re-macerated in water, acidulated with sulphuric acid, which dissolves a new quantity of Corydalia, which is to be thrown down by an alkali, but not mixed with the first precipitate, because it is more difficult to purify. Let the precipitate be dried, and boiled in alcohol till every thing soluble has been taken up. Distill off the greatest part of the alcohol from this solution. Sometimes, on cooling, the residual liquid deposits a little Corydalia in crystals. Evaporate the liquid to dryness, and pour on the residual matter, very dilute sulphuric acid, which dissolves the Corydalia, and leaves the green resinous matter. Precipitate the solution by an alkali, taking care to separate the dark-colored matter which falls first, because it is impure matter. This being removed, the alkali precipitates the Corydalia white, but it assumes a grayish tinge while washing. When dry it is a grayish-white incoherent mass, which stains the fingers." Thus obtained, Corydalia is inodorous and nearly tasteless, soluble in alcohol, but very little so in water; also soluble in ether, caustic alkaline solutions and dilute sulphuric acid. Its alcoholic solution is greenish-yellow, as well as its alkaline; and on account of its solubility in alkalies care must be taken not to add too much alkali to it when precipitating it from an acid solution. It fuses at 212°, becoming translucent in thin coats, and giving a crystalline fracture; a still greater heat drives out water and ammonia, and the substance assumes the form of a brown translucent mass. The muriate and acetate of Corydalia are soluble in water, but not the sulphate. Nitric acid decomposes it, as well as an excess of sulphuric. Infusion of galls will precipitate Corydalia. Mr. Wm. T. Wenzell found the root to contain *Corydalia*, fumaric acid, yellow bitter extractive, acrid resin soluble in alcohol or ether, containing volatile oil, tasteless resin soluble in alcohol, and insoluble in ether, brown coloring matter, starch, albumen, bassorin, cellulose and cortical substance, salts of potassa, lime, and magnesia, carbonate of lime, alumina, sesqui-oxide of iron, hydrated silicic acid, silicious sand, and a trace of protoxide of manganese. He obtained the Corydalia by "evaporating a hydro-alcoholic tincture of the root to the expulsion of the alcohol, and separating the resin by filtration. To the filtrate, ammonia was added in slight excess, and the yellow precipitate collected on a filter. This washed was subjected to the action of boiling alcohol, which dissolved the alkaloid; the alcoholic solution was filtered, evaporated to dryness, and the residue treated with dilute hydrochloric acid, when the alkaloid was taken up, and an additional amount of resin left. The muriated solution was precipitated by ammonia, the precipitate dissolved in boiling alcohol and concentrated, when, on cooling, crystals were deposited. Two or three crystallizations from concentrated alcoholic solutions, and by slow evaporation, gave the pure Corydalia in minute, transparent crystals." As Corydalia has no taste, and no apparent medical properties, it is probable that the virtues of this plant reside in its acrid resin and volatile oil, which may be obtained as follows: Exhaust the powdered root by ether, in a percolator; on spontaneous evaporation of the yellowish-brown ethereal solution, a soft brown-black substance is obtained, which is to be dissolved in alcohol. A solution of acetate of lead, as well as water, added to this alcoholic solution causes a precipitate; and by evaporating it, the acrid resin, with an aromatic odor is left.—(See *Am. Jour. Pharm., Vol. XXVII., p.* 207.).

Properties and Uses.—This agent is peculiar to American practitioners, being much employed by them. It is tonic, diuretic, and alterative. In all syphilitic affections, it is one of the best remedies we have; and will likewise be found valuable in scrofula, and in all cases where tonics are indicated. As a tonic, it possesses properties similar to the Gentian, Colombo, or other pure bitters; its alterative properties, however, render it of immense value. In syphilis it seems to be possessed of magical powers. The *Corydalia* possesses all the alterative properties of the bulb in an eminent degree, and will be found useful in all scrofulous and syphilitic affections, as well as in many cutaneous diseases.

Dose of the infusion, from one to four fluidounces, three or four times a day; of the saturated tincture, from half a fluidrachm to two fluidrachms; of Corydalia, from one half of a grain to one grain, three or four times a day. The infusion to be made by adding four drachms of the powdered bulb to one pint of boiling water.

Corydalia may be advantageously combined with berberin, hydrastin, ptelein, etc., as a tonic, and with podophyllin, xanthoxylin, stillingin, iridin, and phytolaccin, etc., as an alterative. It is *incompatible* with tannic acid and vegetable astringents.

Off. Prep.—Corydalia; Decoctum Corydalis; Extractum Corydalis Hydro-alcoholicum; Syrupus Stillingiæ Compositus; Syrupus Corydalis Compositus; Tinctura Corydalis.

CREASOTUM.

Creasote.

AN OXY-HYDRO-CARBURET OBTAINED FROM TAR.

Preparation.—Creasote was discovered by M. Reichenbach in 1832, and exists in impure pyroligneous acid, and in the tar obtained by the distillation of wood, the latter yielding it in the greatest quantity. The process is briefly as follows (condensed from *Thompson's Organic Chemistry*): Subject Wood Tar to distillation until 56 per cent. are gone over, or till what remains has the consistence of pitch. The distillate consists of two layers, of which the lower one contains Creasote, and an acidulous water, which last, with the oil floating on it, may be thrown away The lower layer is heated, after its separation from the liquor above, and Carbonate of Potassa is added to it until no further effervescence takes place; after standing for a time, a deposit of Acetate of Potassa takes place, from which the liquid is carefully decanted, and again distilled in a glass retort. The first products which swim upon the water are thrown away, and that only is retained which sinks under the water. This is treated with a solution of Caustic Potassa of sp. gr. 1.12, which occasions much heat, and which dissolves the Creasote; the eupione, and other oils which float upon the surface, must be removed. The alkaline solution is boiled, and allowed to cool slowly in the air; oxygen is absorbed, and the solution assumes a brown color; dilute sulphuric acid is added to it, which precipitates the Creasote. The Creasote is treated with a solution of caustic potassa, and precipitated with dilute sulphuric acid so long as it retains the brown color on exposure to the air. After the second distillation, phosphoric acid is usually added to remove a small portion of ammonia which is present.

Pure Creasote is a colorless transparent liquid, of an oily consistence, and refracting light very powerfully. It has a penetrating, smoked-meat odor, and a hot, very caustic taste. Its specific gravity at 68° is 1.037, it boils at 397° F., and is fluid at—16½° F. The Creasote of the shops is often tinged brown. It is combustible, emitting a great amount of smoke, and is a non-conductor of electricity. When concentrated, it destroys the epidermis, dissolves iodine, phosphorus, sulphur, and black oxide of copper, reduces oxide of mercury at a boiling temperature, coagulates albumen, but not fibrin, forms a reddish-yellow solution with cochineal, a deep-red solution with dragon's blood, a pale-yellow with red saunders, a purple with archil, a yellow with madder, and a golden yellow with saffron. It dissolves the coloring matter of indigo, which is precipitated on the addition of alcohol and water. An aqueous solution preserves meat, which has been dipped into it, from putrefaction. Pure Creasote is neutral. Alcohol, ether, bisulphuret of carbon, eupion, naphtha, and acetic ether, mix in all proportions with Creasote. Water dissolves 1.25

parts of Creasote; while on the other hand 100 parts of Creasote absorb 10 parts of water. Without the assistance of heat, Creasote forms two different combinations with potassa; the one is an anhydrous liquid, having an oily consistence; the other a hydrous solid, crystallized in scales, having a white color, and a pearly luster. Soda acts precisely in the same way as potassa. Creasote unites with ammonia, from which it is separated with difficulty.—*T.* Nitric and sulphuric acids decompose it. It consists of 77.42 Carbon, 8.12 Hydrogen, 14.46 Oxygen, or $C_{14} H_9 O_2$.

It has been for years a debated question whether the Creasote of Reichenbach is not in reality a hydrate of phenyle, and, according to Prof. Williamson, experiments have shown that a body homologous to hydrate of phenyle may be obtained from the crude Creasote, and which he names hydrate of cresyle, and which is contained in some qualities of commercial Creasote in greater quantity than in others. (*See Am. Jour. Pharm., Vol. XXVII., p.* 54.) Gorup Besanez, however, obtained a Creasote, in which, by all the usual tests, he failed to discover phenylic acid. This he terms *true* Creasote, and that which contains phenylic acid he terms *false* Creasote, and supposes that these are two distinct bodies. He determines them by chloride of iron and acetic acid. In the presence of carbolic acid, which closely resembles Creasote, chloride of iron always causes a blue-violet color, and afterward a whitish turbidity; and acetic acid completely dissolves carbolic acid, in a gentle heat. Creasote, prepared from beech-wood tar, is not changed by chloride of iron, and is only partly dissolved by ordinary acetic acid in the heat.

Creasote is frequently rendered impure by the presence of some of the other principles formed by the destructive distillation of wood. Pure Creasote is completely soluble in concentrated acetic acid, and solution of caustic potassa, but the above adulterations are not, but swim on the top of the solution. If Creasote leaves a stain on paper not removable by heat, it contains a fixed oil. Brown coloring matter causes Creasote to become brown on exposure to the air, or sunshine.

Properties and Uses.—Irritant, styptic, antiseptic, narcotic, escharotic, and probably diuretic. Used in diabetes mellitus, epilepsy, hysteria, neuralgia, chronic catarrh, hemoptysis, hematemesis, chronic gonorrhea and gleet, and to arrest nausea or vomiting occasioned by hysteria or pregnancy. Externally, in which it is more commonly used, it has been found efficacious in scaly cutaneous affections, burns, external wounds, capillary hemorrhage, indolent and gangrenous ulcers, also, scrofulous, syphilitic and fistulous ulcers and scrofulous ophthalmia; as a gargle, in putrid sore-throat; as an injection, diluted with oil of almonds, in chronic suppuration of the external meatus of the ear, and in toothache, depending on exposure of the nerve. It should most usually be sufficiently diluted, and used in the form of mixture, solution or ointment. Dose, from one to three drops, diluted with two or three fluidounces of weak mucilage, three or four times a day. However, it is seldom used internally at the present day, the pyroligneous acid answering a much better purpose for internal administration. A poisonous dose of Creasote occasions dimness of vision, fixation of the eyes, vertigo, diminution of the action of the heart, coma, and often convulsions. The treatment must be ammonia and stimulants to counteract the depression of the vital powers, with white of egg, oleaginous and mucilaginous drinks.

Anatomical specimens may be kept in an aqueous solution of Creasote, equally as well as in alcohol. Moldiness in ink may be prevented by the addition of a few drops of Creasote to it; it is also added to preservative fluids for microscopical preparations for the same purpose.

Off. Prep.—Unguentum Creasoti.

CRETA PRÆPARATA.

Prepared Chalk.

Preparation.—Rub Chalk (Carbonate of Lime) very fine, with a little water; stir this into a large quantity of water, and when the coarse particles have subsided, pour off the supernatant turbid liquor, into another vessel, and let it settle. Pour off the water, and dry the powder.

History.—Chalk has not been found in the United States, but is obtained in abundance in the south of England, and the adjacent coast of France. It occurs in the newest secondary strata, and constitutes with its subordinate rocks a distinct and peculiar formation. It is scarcely ever a perfectly pure carbonate of lime, always containing silica, alumina, iron, and fossil remains of land and marine animals, which may be detected by the microscope. It is a carbonate of lime, and is identical with marble (*which see*) in its relations to water, air, alcohol, heat and acids.

It is termed by some writers, *Native Friable Carbonate of Lime.* There are two kinds of it, Hard and Soft Chalk; the latter is commonly preferred for medical purposes, though the former may be employed as well. It has an earthy appearance, pure white when unadulterated, grayish-white when impure, inodorous, tasteless, opaque, insoluble, giving a sensation of roughness when touched, very friable, with an earthy fracture, leaving a white mark when drawn over a resisting surface, and having the specific gravity 2.3 to 2.7. Pure Chalk is completely dissolved by muriatic acid, with the exception of silica when present; if this solution contains alumina the addition of ammonia will cause a white precipitate; if it contains oxide of iron the precipitate will be in yellow flakes. Chalk should not be employed as a medicine until it has been divested of its gritty particles by levigation and elutriation, as above described. In this process, the coarser gritty particles become deposited, leaving the soft Chalk floating in the liquor, which being poured off, the impalpable powder is collected as it slowly descends; after again pouring off the liquor, as soon as all the powder has subsided, the substance left behind is placed in quantities of ten or twenty grains or more upon some flat, porous body, and forms, when dried, conoid or pyramidal figures, which are known in commerce by the name of *Prepared Chalk.*

Properties and Uses.—Antacid, astringent and absorbent. Used in acidity of the stomach and diarrhea, combined with aromatics and opium; externally, to ulcers and burns, to absorb the ichorous discharge, and to prevent excoriations from pressure or friction. Dose, from ten grains to one drachm.

Prepared oyster-shell, *Testa Præparata*, has the same properties, but is now out of use; it is prepared by freeing the shells from extraneous matter, by washing with boiling water, then powdering and proceeding as above.

CROCUS SATIVUS.

Saffron.

Nat. Ord.—Iridaceæ. *Sex. Syst.*—Triandria Monogynia.

THE STIGMAS.

Description.—Saffron is a perennial herb, with a roundish *cormus;* the integuments consisting of parallel fibers, which are distinct at the upper end. The *leaves* are radical, very narrow, linear, long, flaccid, revolute at the margin, with a longitudinal, white furrow above, and surrounded at the base with long membranous sheaths. The *flowers* are large, axillary, nearly or quite sessile on the bulb, with a two-valved membranous, thin, transparent, radical spathe, appearing with the leaves, striate, with a long white tube and purple, elliptical segments. *Style* filiform, with three *stigmas* deeply divided, linear-wedge shaped, deep orange color, hanging down on one side of the flower, fragrant, notched at the points. *Capsule* three-celled, many-seeded; *seeds* roundish.—*L.*—*W.*

History.—Saffron is indigenous to Asia Minor, and is much cultivated in some parts of Europe. It is also cultivated in the United States. Its growth is frequently interfered with, by the bulb becoming changed into a dark powder, the result of some disease; also by the adherence of a fungous plant to the cormus. Saffron flowers in autumn; the flowers are in abundance, and mantle the fields with a flax-gray covering. Each flower has one style, on the summit of which are the smooth, shining, dark orange-red stigmas. Their odor is pleasant and aromatic, but narcotic; their taste a fine, aromatic bitter, and they immediately give a deep yellow color to the saliva when chewed. The flowers are gathered early in the morning, just before they open; the stigmas are picked out, very carefully dried by the heat of a stove, and sometimes compressed into firm cakes. Five pounds of fresh Saffron are required to yield one pound of dry.—*Ed.* There are two kinds of Saffron in commerce, viz: the *Hay Saffron*, which is the best kind, and consists simply of the stigmata entangled together, and retaining their original deep-orange color; and the *Cake Saffron*, which is in flexible cakes, about half a line in thickness, and of a dirty, brownish-orange tint, made by beating the stigmata together before they are quite dry.

Saffron has a powerful, aromatic, somewhat stupefying odor, and a bitterish, balsamic, rather acrid taste. It imparts its properties to water, vinegar, or spirit. The best Saffron is that which is recent, being very slightly damp, not readily reduced to powder, of a strong, acrid, diffusive odor, but free from any disagreeable smell when burned; it has a soapy-like feel between the fingers, coloring them orange; the cake Saffron should also be tough and firm in tearing. On account of the great volatility of the aromatic part of the Saffron, it should be wrapped up in bladder, and preserved in a box, or tin-case.—*Ed.*

Saffron has been analyzed by Vogel and Bouillon-Lagrange (1811), and by Aschoff (1818); it contains volatile oil, wax, polychroite, gum, soluble albumen, woody fiber, moisture, and balsamic matter, soluble in ether or alcohol. The *polychroite* was so named on account of the numerous colors which it is capable of assuming. It is procured by making an aqueous infusion of Saffron, evaporating it to the consistency of honey; this residue is then to be digested in alcohol of 0.800, and then evaporating the alcoholic solution to dryness. When pure it is intensely yellow, or scarlet-red, odorless, bitter, soluble in alcohol, fixed and volatile oils, sparingly soluble in ether and cold water, absorbs moisture and changes to a viscid liquid, and becomes colorless under exposure to the sun's rays. Sulphuric acid changes it to a deep indigo-blue color; nitric acid to a green, but the color is very fugitive. The volatile oil of Saffron is yellow, heavier than water, and has a burning, bitterish taste with some acridity; it is obtained by distilling Saffron with water.—*P.*—*T.*

Saffron is liable to several adulterations; *sand*, or *grains of lead* are added to increase its weight, and may be detected by scattering the Saffron loosely over a sheet of white paper, when these foreign admixtures will fall out. *Water* or *oil* may be detected by pressing a small portion of the Saffron between folds of white blotting-paper, which will become either moistened or greased, according to the kind of adulteration. *Petals* of other plants may be known by their appearance, and by their expansion when placed in hot water, when, if any doubt remains, a magnifying glass will enable one to detect the foreign petals; *muscular fibers* may be known by the odor of burning horn, emitted on burning the suspected article. When rubbed between the finger and thumb, without staining the skin yellow, the Saffron has been exhausted by water or spirit.—*P.*—*C.* According to J. Muller, genuine Saffron immediately assumes an indigo-blue color, when acted upon by chemically pure sulphuric acid.—*Chem. Gaz., May*, 1845, *p.* 197.

Properties and Uses.—Emmenagogue and diaphoretic. Has been of benefit in amenorrhea, dysmenorrhea, chlorosis, hysteria, and in suppression of the lochial discharge. As a diaphoretic, used in febrile and exanthematous diseases, especially of children. Many consider this valuable agent as inert. Dose of the powder, from twelve to forty grains; of the tincture or syrup, from one to two fluidrachms; of the infusion, from one to three fluidounces.

Off. Prep.—Tinct. Aloes et Myrrhæ; Tinctura Serpentariæ Composita.

CROTON ELEUTERIA.

Cascarilla.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE BARK.

Description.—Croton Eleuteria is a small tree, said to rise to the height of twenty feet, and branching thickly at the top. The *branches* and *twigs* are angular, rather compressed, striated, downy, ferruginous. The *leaves* are petiolated, alternate, ovate, with a short but obtuse point, entire, slightly nerved, bright-green above, with a few scattered leprous dots, silvery, and very downy beneath; *petioles* short, scurfy. *Racemes* axillary and terminal, branched or compound; the branches short, divaricating, covered with numerous, closely-parted, subsessile, whitish, monœcious flowers. *Sterile flowers* above and smallest; *fertile ones* below, few, and on short stalks. *Stamens* ten to twelve. *Capsule* roundish, minutely warted, scurfy, not much larger than a pea, with three furrows, three cells, and six valves.—*L.*

History.—The tree from which Cascarilla is obtained is a native of the West Indies, and is found plentifully in the island of Eleutheria, from which it derives its name. It was, for a time, supposed to have been derived from the *Croton Cascarilla*, a small tree growing in the Bahamas, Hayti, Peru, and Paraguay, but this is now ascertained by botanists to have been an error. Cascarilla bark is imported from the Bahama islands, Jamaica, etc., in the form of thin fragments, or quills, of various sizes, seldom exceeding four or five inches in length, of a grayish color externally, internally dull-brown and generally shining, hard, compact, brittle, of a short, resinous fracture, easily pulverized, of a feeble but agreeable odor, and a strong, aromatic, bitterish, acrid taste. On account of its agreeable odor when burned, resembling that of musk, vanilla, or amber when heated, it is often added in small portions to tobacco, by smokers, to render the fumes more fragrant; but it produces unpleasant symptoms if used thus too freely. Water, or spirit readily extracts its active princiciples, but diluted alcohol is the preferable menstruum. Trommsdorff found the bark to contain volatile oil, bitter resin, gum, and bitter matter with trace of chloride of potassium, and woody fiber. Messner found the oxide of copper in its ashes. Brandes has detected a peculiar alkaline substance, *cascarillina.* Duval has found in it a neutral principle which he calls *cascarillin*, a disagreeable, fatty substance, an acid very much resembling the tannic, etc. *Cascarillin* may be procured by treating an aqueous infusion of the bark with acetate of lead, and then passing sulphureted hydrogen into the liquid to precipitate the lead; filter the fluid, add animal charcoal to it, and evaporate. Filter the second time, and evaporate at a reduced temperature, until the liquid is of the consistence of molasses. On cooling it becomes solidified, being an impure cascarillin. To obtain it pure, digest it in alcohol at 50°, and subsequently treat it with animal charcoal and alcohol at 212° F., repeating this process two or three times. Set the tincture aside to evaporate and crystallize; the cascarillin is deposited in colorless, odorless, bitter, non-nitrogenous crystals, which are neutral, dissolved by ether or alcohol, but only partially by water. It resembles salicin in many respects.—*Journ. de Pharm., Vol. VIII., p.* 96, 3*d series.*

Properties and Uses.—Tonic, and stimulant. Used in dyspepsia, flatulency, chronic diarrhea, in debility attending chronic diseases, convalescence from acute diseases, and to arrest vomiting. When cinchona produces nausea, the addition of Cascarilla will prevent it. Dose of the powder, from one to two scruples; of the tincture, from one to four fluidrachms; of the infusion, from one to four fluidounces. On account of its musky odor, it is a common ingredient of fumigating pastiles.

CUCUMIS COLOCYNTHIS.

Colocynth.

Nat. Ord.—Cucurbitaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE FRUIT DIVESTED OF ITS RIND.

Description.—*Colocynth*, or *Bitter Cucumber*, is an annual plant, with a whitish *root*, and prostrate, angular, hispid *stems*. The *leaves* are alternate, cordate, ovate, many-lobed, white with hairs beneath; the lobes obtuse; petioles as long as the lamina. *Tendrils* short. *Flowers* axillary, yellow, solitary, stalked; females, with the tube of the calyx globose, and somewhat hispid, the limb campanulate, with narrow segments. *Petals* small. *Fruit* globose, smooth, size of an orange, yellow when ripe, with a thin solid rind, and a very bitter flesh.

History.—The Bitter Apple, or Cucumber, is a native of Northern Africa, the Cape of Good Hope, Western Asia, etc., and is cultivated in Italy and Spain. The fruit assumes a yellow or orange color externally during the autumn, at which time it is collected, peeled, and dried quickly, either in a stove or in the sun.—*Ed.* The Colocynth with which the United States is supplied, is chiefly derived from the Mediterranean ports. That which is deprived of its rind, is very white, light, spongy, and without seeds, is considered the best article; that which contains the seeds is inferior; and the grayish or brownish pith of the larger fruits is of the poorest quality. The pulp only of the fruit is the officinal portion; the fruit, as usually met with in the shops, is about the size of a small orange. The pulp is tough, pulverized with difficulty, nearly inodorous, but intensely and disagreeably bitter. Water, ether, or alcohol acquires its active properties; water forms a mucilaginous solution, from which the extract of Colocynth is obtained by evaporation; it is pale brown, translucent, elastic, and intensely bitter. Meissner has detected in Colocynth a bitter principle called *Colocynthin*, extractive, fixed oil, resin insoluble in ether, gum, bassorin, phosphates of lime and magnesia, lignin, water, etc.—*P.* It is *incompatible* with the fixed alkalies, sulphate of iron, nitrate of silver, acetate of lead, and vegetable astringents, containing tannin or gallic acid.

Colocynthin may be obtained by exhausting the pulp previously freed from the seeds, with successive portions of cold distilled water, until it is deprived of its bitterness; then filtering the solution, heating it to boiling point, and adding, while hot, diacetate of lead, as long as any precipitation continues. When cold, filter the supernatant liquid, and gradually add to it diluted sulphuric acid, until it no longer throws down a precipitate; again boil to remove the free acetic acid, and filter to separate the sulphate of lead. By this means all the organic matter, except the colocynthin, is removed. Evaporate the filtered liquor cautiously and nearly to dryness, and dissolve the colocynthin out of the residuum by means of strong alcohol, which leaves the salts undissolved as sulphates. By evaporating the alcoholic solution the colocynthin is obtained pure.—*Am. Jour. of Pharm.*, *XXIII.*, 166.

M. Mouchon prepares colocynthin by intimately mixing one hundred and twenty-five parts of very finely powdered Colocynth with thirty parts of purified animal charcoal, introducing the mixture into a conical percolator containing thirty additional parts of animal charcoal, and proceed by displacement with two hundred and fifty parts of alcohol of 95 per cent., and afterward by alcohol of 56 per cent., until two hundred and fifty parts of concentrated alcoholic tincture is obtained. Evaporate this spontaneously in flat dishes to perfect dryness. The product is friable and pulverizable, garnet-colored, insupportably bitter, soluble in water and alcohol, insoluble in ether, and purges strongly in the dose of one and a half grains. This substance may be purified by dissolving it in strong alcohol, and treating it with a little animal charcoal.—*Am. Jour. of Pharm.*, *XXVIII.*, 166.

Colocynthin is a non-crystalline, yellowish or brownish, semitransparent, brittle body, fusing at 200° F., burns with a flame like resin, soluble in alcohol or ether, less so in water, but imparting to it an almost insupportable bitterness. It is neutral; a white precipitate occurs when infusion of galls is added to its solution in water.—*T.*

Properties and Uses.—Colocynth is an irritant and cathartic; it acts very powerfully, producing copious watery evacuations. Even in moderate doses, it has excited inflammation of the mucous membrane of the intestines, vomiting, severe tormina, and bloody stools. It is never used alone, because its violence is greatly mitigated, while its efficacy and certainty are not impaired, by uniting it with other cathartics, as aloes, scammony, etc.—*C.* The addition of extract of hyoscyamus will likewise deprive it of its harsh and griping effects. Its principal employment is in passive dropsy, in cerebral derangements, and in pills with other cathartics for the purpose of overcoming torpid conditions of the biliary and digestive systems. Its irritant effect upon the rectum may influence the uterus by sympathy of contiguity, and thus provoke menstruation, and on the same principle, dissolved in whisky, it has cured gonorrhea. It may be used in moderate doses, in all diseases where catharsis is indicated. The powder applied to an ulcer, or raw surface, affects the lower bowels in the same manner as when taken internally. It is said that Hippocrates used the Colocynth as a pessary for the purpose of exciting menstruation. The *oil* of Colocynth has been recommended as an external remedy for neuralgia. Dose of Colocynth is from four to ten grains, either in powder, or aqueous extract; of the alcoholic extract, from one to four grains. When to be given alone, it should be triturated with some inert or insoluble powders, as gum or farinaceous matter, in order to diminish its severity of action.

Off. Prep.—Extractum Colocynthidis; Extractum Colocynthidis Compositum.

CUCURBITA CITRULLUS.

Watermelon.

CUCURBITA PEPO.

Pumpkin.

Nat. Ord.—Cucurbitaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE SEEDS.

Description.—The Cucurbita Citrullus of Linnæus, and Cucumis Citrullus of Seringe, is an annual plant with a prostrate, slender, hairy *stem*, with branching tendrils. The *leaves* are palmately five-lobed, very glaucous beneath, lobes mostly sinuate-pinnatifid, all the segments obtuse. The *flowers* are yellow, solitary, on hairy peduncles, and bracted at the base. *Calyx* tubular-campanulate, five-toothed; *corolla* deeply five-parted; *filaments* of the male flower, three; *pistils* of the female, three-cleft; *style* short; *stigmas* three, thick, two-lobed; *pepo* or *fruit*, oval, or elliptical, smooth, discolored, indehiscent, subligneous, and light or dark-green externally, beneath which is a white, juicy substance, and in the center a red or yellow edible pulp, sweet, juicy or watery, and delicious; it is from three to five-celled, and contains many obovate, smooth, compressed seeds, thickened at the margin, and of a black or yellowish-white color.—*W.*

Cucurbita Pepo is also an annual plant, hispid and scabrous, with a procumbent *stem* and branching *tendrils*. The *leaves* are large, cordate, palmately five-lobed, or angled, denticulate; the *flowers* are yellow, large, axillary, the males long-pedunculate. *Corolla* companulate; *petals* united and coherent with the calyx. *Calyx* of male flowers, five-toothed; of females the same, and upper part deciduous after flowering; *stigmas* three, thick, two-lobed; *pepo* or *fruit* sub-ligneous, very large, roundish, or oblong, smooth, yellow when ripe, furrowed and torulose, containing yellowish seeds, somewhat resembling those of the watermelon in form.—*W.*

History.—The Watermelon is a native of Africa and Southern Asia, and is cultivated in this country for its large and delicious fruit which is usually ripened in August, the flowers appearing in June and July. The pumpkin flowers in July, and matures its fruit in September and October; it is a native of the Levant, and is extensively cultivated as a kitchen vegetable, and for cattle. The seeds of these plants are used in medicine; their virtues reside in the external covering which contains a large proportion of mucilage, which is freely imparted to water; hence, in preparing an infusion the seeds should never be bruised. An oil may be obtained from the pumpkin seeds, and probably from those of the watermelon also, by expression.

Properties and Uses.—Mucilaginous and diuretic, and of service in strangury, and other urinary affections, also in gastritis, enteritis, and febrile diseases. The infusion may be drank freely. The red, fleshy, juicy pulp of the watermelon is diuretic, and forms a grateful article of diet for febrile patients, when not contra-indicated. The expressed oil of the pumpkin seeds, in doses of from six to twelve drops several times a day, is said to be a most certain and efficient diuretic, giving quick relief in scalding of urine, spasmodic affections of the urinary passages, and has cured gonorrhea. Half a fluidounce of oil of pumpkin seeds taken upon a fasting stomach, repeated in two hours, and in another two hours followed by a dose of castor-oil containing half a fluidounce of the pumpkin-seed oil, has been effectual in removing tape-worm. The seeds of the *Cucurbita Lagenaria*, or gourd, the *Cucumis Melo*, or muskmelon, and the *Cucumis Sativus*, or cucumber, possesses similar properties, but in a milder degree.

Off. Prep.—Infusum Cucurbitæ.

CUMINUM CYMINUM.

Cumin Seed.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE FRUIT.

Description.—This is an annual herb, with an erect, round, slende branched *stem*, about a foot high. The *leaves* are multifid, with long filiform segments. The *flowers* are small, white or pink, overtopped by the bracts, which, after flowering, are reflexed. *Umbels*, both partial and general, of about five rays, with the involucres consisting of two or thre e filiform, one-sided bracts. The *fruit* is about two lines long, much longer than the pedicels, nearly taper, but little contracted at the sides, fusiform, crowned by the short teeth of the calyx, densely covered with short rough hair upon the channels, less densely upon the ridges, which are paler, filiform, and a little raised; *seeds* or *half-fruits*, two, oblong, plano-convex, with the plane surfaces together.—*L.*

History.—This plant is cultivated in many parts of Europe, though originally from Egypt. The fruit or seeds are ovate or fusiform, of a light brown or grayish color, with two adhering concavo-convex fruits. The fruit resembles caraway, but is larger. Each seed or fruit presents seven ridges, which are furnished with small prickles. Their odor and taste is similar to that of caraway, but warmer, and not so agreeable. They contain a volatile oil, which may be separated by distillation with water, of a yellowish color, thin, sp. gr. 0.945, with the taste and odor of the plant. It contains two oils, a carbo-hydrogen, called *Cumen* or *Cymen*, $C_{18} H_{24}$, and an oxygenated oil, called *Hydruret of Cumyl* $C_{20} H_{11} O^2+H$.

Properties and Uses.—Highly stimulant, and carminative; possessing medical properties similar to the other aromatic fruits of umbelliferous plants, but more stimulating. They are seldom used in the United States. Dose is from fifteen to sixty grains.

CUNILA MARIANA.

Dittany.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE WHOLE HERB.

Description.—This plant, also called *Stonemint*, *Mountain Dittany*, etc., is an indigenous, perennial plant, with a fibrous *root*, and smooth, slender, four-angled, mostly purplish, corymbosely branched *stems*, growing one or two feet high. The *leaves* are opposite, small, nearly smooth, ovate, serrate, subsessile, roundish or subcordate at the base, tapering to a point, and punctate with pellucid dots. The *flowers* are white or pale-red, pedunculated, with subulate bracts at the base of the three-forked pedicels, and are in corymbose, axillary and terminal *cymes*. *Corolla*, nearly twice as long as the calyx, pubescent, middle lobe longer than the others, upper lip erect, flat, emarginate, lower lip spreading. *Calyx* green, ten-ribbed, equally five-toothed, hairy in the throat, punctate. *Stamens* two, erect, exserted, distant. *Anthers* small, didymous; *stigma* bifid, exserted; *seeds* four, small, obovate.—*W.*—*G.*

History.—This plant is found growing in dry hills and woods, and on rocks, in nearly all parts of the United States, flowering from June to October. The herb is very fragrant, with a warm, spicy taste; its taste and odor are due to a volatile oil which may be procured by distillation.

Properties and Uses.—Stimulant, carminative, antispasmodic, and diaphoretic. Used freely in warm infusion to promote perspiration, to relieve flatulency, and as an emmenagogue. Said to be useful for cold, headaches, and fevers, also to relieve nervous headache, and hysterical disorders, colic, indigestion, and all nervous affections. The volatile oil possesses all the medicinal properties of the herb, and may be given in doses of from five to ten drops.

CUPRI SUBACETAS.

Subacetate of Copper.

Preparation.—Subacetate of Copper, or *Verdigris*, is prepared in the southern parts of France, chiefly. It is formed by exposing sheet copper to the action of the acetous fumes, which are evolved in the process of wine-making. The refuse of the grapes placed in heaps runs into the acetous fermentation, whereby the copper sheets are oxidized, and the oxide so formed unites with the acid. About the end of four or six weeks this is removed by scraping, and the plates are again exposed to the further action of the grape refuse. The paste-like substance which is thus from time to time removed from the plates, is pounded with mallets of wood, and put up in bags of white leather, each weighing from twenty-five to thirty pounds. It may also be made by sprinkling vinegar over the copper.

History.—Verdigris is obtained in loosely aggregated lumps, or in powder; it has a pale-green, or blue color, according to the process employed in obtaining it, a disagreeable, acetous odor when the powder is conveyed to the nostrils, and a nauseous, styptic, coppery taste. Alcohol does not dissolve it; and water partially dissolves it, at the same time decomposing it, precipitating a deep-green insoluble trisacetate ($3CuO, \bar{A}, 2\,HO$), which ultimately becomes black, while the neutral acetate remains in the solution. Verdigris is speedily blackened by sulphureted hydrogen; diluted sulphuric acid, with the aid of heat, almost wholly dissolves it, from which solution no precipitate is caused by ammonia; muriatic acid dissolves it, with the exception of about five per cent. of impurity; concentrated sulphuric acid decomposes it, evolving acetous fumes; ammonia dissolves all but its impurities, forming an intense violet-blue solution.

Verdigris is a composition of several of the acetates of copper; *blue Verdigris* is chiefly the hydrated diacetate of copper, $2\,Cu\,O, \bar{A}, 6\,HO$; *green Verdigris* consists of the subsesquiacetate and the trisacetate of Copper, or $3\,Cu\,O, 2\,\bar{A}, 6\,HO + 3\,Cu\,O, \bar{A}, 2\,HO$. The so-called "Verdigris," observed on copper vessels when exposed to moisture, or not cleansed, is not an acetate of copper, but a carbonate. Verdigris, when swallowed, is decomposed by zinc and copper filings, in the dose of from half a drachm to two drachms, followed by the free use of warm water, and afterward subduing the inflammatory symptoms by the usual means; or, wheat flour, milk, and white of egg, may be freely administered in water, or sugar and water, and vomiting be produced as speedily as possible.

The Neutral Acetate of Copper, or crystallized ærugo, also called *Crystals of Venus*, $Cu\,O, \bar{A}, HO$, is not used in medicine; it forms dark green rhombic prisms, of a feeble acetous odor, a nauseous metallic taste, efflorescent, soluble in five parts of boiling water, partially soluble in alcohol, inflammable, burning in the open air with a beautiful green flame.

Properties and Uses.—Detergent and escharotic. Never used internally, but occasionally employed externally by some practitioners to remove syphilitic verrucæ, fungous growths, and callous edges, and as an application to obstinate ulcers, ringworm, ringworm of the scalp, ophthalmia tarsi, etc. The powder may be sprinkled on the surface, or it may be used in the form of ointment. It is best employed as an escharotic when deprived of its water of crystallization by heat, which leaves an efflorescent mass.

CUPRI SULPHAS.

Sulphate of Copper.

Preparation.—Sulphate of Copper, or *Blue Vitriol*, is made in various ways; by dissolving copper in dilute sulphuric acid, evaporating and crystallizing; or, by roasting the sulphureted ores of copper, allowing them to oxidate and become converted into sulphate, lixiviating the product, and crystallizing the solution; as sulphate of sesquioxide of iron is apt to be present, this may be thrown down from the solution of the crystals by treating it with a superabundance of protoxide of copper. Wittstein gives the following method: "Two parts of metallic copper, in small pieces, three and one-third parts of concentrated sulphuric acid, twelve parts of water, and four parts of nitric acid, specific gravity 1.20, are put into a glass flask, and the latter placed in a sand-bath, heated, at first gently, and afterward boiling, as long as there is any perceptible action on the copper; it is then filtered, and placed in a cool spot. The salt which separates after some days is collected, the mother-liquor evaporated so long as crystals will form; these are spread on a piece of filtering paper to dry in the air. The produce will be seven parts of Blue Vitriol for two of copper. In this case, instead of metallic copper, the copper scales will be more economical to use; the relative proportions, in this case, substituting two parts of nitric acid for four, will be the same."

Metallic copper is scarcely acted on by dilute sulphuric acid, even when warmed; the addition of sufficient nitric acid to oxidize causes it to readily dissolve. The nitric oxide from the reduced nitric acid is evolved, and forms the brown vapors of hyponitric acid. 1,188 parts of copper require 1,839 parts of hydrated sulphuric acid, and 2,500 parts of nitric acid specific gravity 1.20 (27 per cent. anhydrous acid); the remainder of the process requires no explanation. By using copper (forge) scales, less nitric acid is requisite, as they consist principally of suboxide of copper, Cu 2 O, which already contains the half of the necessary oxygen.

History.—Sulphate of Copper forms beautiful azure-blue, translucent, oblique rhombic crystals, which dissolve in three and a half parts of cold, and an equal weight of hot water, and are not dissolved by alcohol. Its solution has an acid reaction. The salt is odorless, possesses an astringent, nauseous, coppery taste, gradually gives off water when exposed to the air, and acquires a white coating. Heated it fuses, losing its water of crystallization, and forming a white anhydrous powder, formerly known as *pulvis sympatheticus;* and which at a red heat gives off its acid, yielding the brown protoxide of copper.

The solution of Sulphate of Copper is of a fine blue color; sulphureted hydrogen causes a brownish-black precipitate, when added to it; caustic potassa, a bluish-green precipitate, but if added in slight excess, azure-blue; ammonia, an azure-blue, which is redissolved if an excess of the alkali be added; solution of arsenious acid with the addition of an alkali, a grass-green or apple-green. *Aqua sapphirina* is the deep-blue solution made by ammonia redissolving the bluish-white precipitate of hydrated oxide of copper, produced by potassa, soda, or ammonia, added to the solution of Blue Vitriol. Sulphate of Copper is likewise *incompatible* with chloride of calcium, borate of soda, corrosive sublimate, acetates of lead, and of iron, alkalies, earths, phosphates, all infusions containing tannic acid, etc. When it is contaminated by sesquioxide of iron, an excess of ammonia will precipitate the iron, but not the copper. Sulphate of Copper is composed of one equivalent each of protoxide of copper and sulphuric acid, and five equivalents of water, $Cu\,O+SO_3+5\,HO=125$.

Properties and Uses.—It should never be used internally. Externally it is occasionally employed as an escharotic or stimulant; and is applied by some practitioners to indolent ulcers, warts, callous edges, fungous growths, chancres, etc., and as a styptic to capillary hemorrhages, and as a wash in some cases of chronic ophthalmia. From two to ten grains of the salt dissolved in a fluidounce of water, according to the circumstances under which it is to be employed, will form a stimulating lotion.

In cases of poisoning by Sulphate of Copper, empty the stomach, and give white of egg freely in sugared water. Treat subsequent inflammation on general principles.

CURCUMA LONGA.

Turmeric.

Nat. Ord.—Zingiberaceæ. *Sex. Syst.*—Monandria Monogynia.

THE RHIZOMA.

Description.—This is a perennial plant, with the roots or tubers oblong, palmate, and deep orange inside. The *root-leaves* are about two feet long, lanceolate, long petioled, tapering at each end, smooth, of a uniform green; *petioles* sheathing. The *spike* is erect, central, oblong, green. *Flowers* dull yellow, three or five together, surrounded by bracteolæ.—*L.*

History.—Turmeric is indigenous to several parts of Eastern Asia, and is extensively cultivated in China, Hindostan, etc., where it is propagated from cuttings of the root. The Chinese Turmeric is generally preferred. The root, when dry, is in slightly curved cylindrical or oblong tubers, about two or three inches in length, and an inch in diameter, often pointed or tapering at one end, yellowish externally, with transverse parallel rings, internally deep yellow or reddish-brown, marked with shining points, dense, solid, having a short, granular fracture, and forming a lemon-yellow powder. It has a peculiar, somewhat fragrant odor, and a bitterish, slightly acrid taste, like that of ginger, exciting a moderate degree of warmth in the mouth, and communicates a yellow color to the saliva. It yields its properties to water or alcohol. M. M. Vogel and Pelletier found it composed of an acrid volatile oil, brown coloring matter, gum, starch, chloride of calcium, woody fiber, and a yellowish coloring matter, named *curcumin.* Curcumin is obtained by digesting Turmeric in boiling alcohol, filtering, and evaporating the solution to dryness. Digest this residue in ether, filter, and evaporate. The curcumin thus procured is mixed with some volatile oil and chloride of calcium, from which it may be freed by oxide of lead. It is solid, heavier than water, reddish-brown when in lumps, but yellow when in powder, is very little soluble in water, but readily so in alcohol, ether, fixed and volatile oils. It deliquesces slightly in a moist atmosphere, fuses at 104°, and then swims on water. Alkalies change it to a reddish-brown.—*T.*

Properties and Uses.—Turmeric is a mild aromatic stimulant, but is seldom used in this country, except to color ointments and pharmaceutic mixtures. *Turmeric paper* is much employed as a test for alkalies, which render it reddish or brownish; white bibulous paper, or paper not sized, is brushed over with the tincture or decoction, or dipped into one of them, and dried in a neutral atmosphere. Four drachms of Turmeric to three fluidounces of proof-spirit, or to five or six fluidounces of water, forms the tincture and the decoction.—*P.* The concentrated mineral acids, boracic acid, and numerous salts, are said also to turn Turmeric paper red, or reddish-brown—if this be so, its indications can not be relied on with certainty.

CYDONIA VULGARIS.

Quince.

Nat. Ord.—Pomaceæ. *Sex. Syst.*—Icosandria Pentagynia.

THE SEEDS.

Description.—This is a well-known shrub or tree, from eight to twenty feet high, the *leaves* being oblong-ovate, obtuse at base, acute at apex, entire, smooth above, tomentose beneath. The *flowers* are solitary, white with a purple tinge, large, terminal. The *pome* or *fruit* tomentose, obovoid, yellow when ripe, having a peculiar fragrance, and an austere, acidulous, and astringent taste; *cells* five; *seeds* many, in a thick, soluble mucus.—*W.*—*L.*

History.—The Quince-tree is a native of Candia, but is cultivated extensively in this country and Europe, and its fruit is much employed in making jellies, preserves, etc. The parts used in medicine are the seeds; they are ovate-acute, flat on one side, convex on the other, brown externally with a reddish tinge, internally white, odorless, and of a bland, mucilaginous taste. The most external coat of the seeds is composed of very fine cells, in which is lodged a large quantity of mucilage, which is taken up by water at 212° F.; eight fluidounces of water may thus be made very mucilaginous by sixty grains of the seeds. The decoction, evaporated to dryness and powdered, will form a proper mucilage with water, in the proportions of three grains to the fluidounce. One part of it gives a semi-syrupy consistence to a thousand parts of water. Pereira proposes to call this mucilage *Cydonin;* he considers it a peculiar variety of gum, which, like Arabin, is soluble in cold or boiling water and gelatinizes with sesquichloride of iron; but, unlike that principle, it is not affected by silicate of potassa.

Properties and Uses.—Decoction of Quince seeds forms a demulcent mucilage, very useful in gonorrhea, dysentery, aphthous affections, and excoriations of the mouth and fauces, also as a collyrium in conjunctival ophthalmia. A syrup prepared from the fruit, or the jelly, forms an agreeable article, either alone or added to drinks, for patients laboring under febrile diseases, diarrhea, dysentery, and nausea.

Off. Prep.—Decoctum Cydonii.

CYNARA SCOLYMUS.

Garden Artichoke.

Nat Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE LEAVES.

Description.—This herb is perennial, with subspinose, pinnate and undivided *leaves; heads* discoid, homogamous; *involucre* dilated, imbricate; *scales* ovate, with fleshy bases, emarginate, pointed; *receptacle* setaceous; *pappus* plumose, sessile; *achenia* not beaked.—*W.*

History.—This well-known plant is a native of Southern Europe, and is cultivated in this country from suckers, as a kitchen plant, they being placed in rows about three feet apart. The flowers, or *heads* as they are commonly called, appear in August and September, and are the parts used; the succulent receptacle and part of the calyx-leaflets are the edible portions. In their young state, the heads, prepared with vinegar, salt, etc., are much valued by some. The corollas are used for coagulating milk. The juice of the leaves is amarous.

Properties and Uses.—Diuretic and alterative. Reputed very beneficial in dropsies, and has been efficacious in rheumatism, gout, jaundice, tic-doloreux, etc. The recent leaves only should be used, in the form of extract, or alcoholic solution. Dose of the tincture, thirty to sixty drops, repeated three times a day; of the extract, three to six grains.—*Dr. Badely, in London Lancet*, 1843, *p.* 556.

This plant must not be confounded with the *Helianthus Tuberosus*, or Jerusalem Artichoke, a species of sunflower, and the tuberous roots of which are sometimes used as a substitute for potatoes.

CYNOGLOSSUM OFFICINALE.

Hound's Tongue.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND ROOT.

Description.—This is a biennial plant, with an erect, silky-pubescent *stem*, growing from one to two feet in height. The *leaves* are hoary, with soft down on both sides, lanceolate, acute, entire,—radical ones alternate at the base, petiolate,—cauline ones sessile, clasping, with rounded, or slightly heart-shaped bases. The *flowers* are in terminal, panicled clusters, recurved at the end; *calyx* downy, five-parted; *corolla* reddish-purple, short, funnel-form, vaulted; throat or orifice closed by five converging, convex scales. *Stamens* shorter than the corolla. *Achenia* depressed, fixed laterally to the style; *seeds* rough, with hooked prickles.—*W.*—*G.*

History.—This plant is met with in Europe and this country, growing in waste grounds and road-sides; its name is derived from the peculiar form of the leaf; it bears purple flowers in June and July. The root is preferred to the leaves; it has a heavy, mouse-like, unpleasant odor, which is removed by desiccation, and a mawkish, amarous taste. The fresh plant is much more active than the dried.

Properties and Uses.—Anodyne, demulcent and astringent, and has been used in coughs, catarrhs, hemoptysis, diarrhea, and dysentery. Externally in the form of a poultice, it has been found highly beneficial in scrofulous tumors, burns, gôitre, and may be applied to recent contusions or inflammations, with much advantage, also to remove the pain and soreness attending irritated, bruised, or chafed parts, giving complete and immediate relief, especially in excoriation of the feet from much traveling. The tincture, or the application of fresh leaves, bruised, will remove the swelling and ecchymosis consequent upon severe blows or bruises. The *C. Amplexicaule*, or Wild Comfrey, affords a root which may be substituted for the officinal Comfrey.

CYNOGLOSSUM MORRISONI, variously called *Virginia Mouse-ear*, *Beggar's-lice*, and *Dysentery weed*, has been variously classed by Botanists, as

Rochelia Virginiana, *Myosotis Virginica*, and *Echinospermum Virginicum*. It is an annual plant, with an erect, hairy, furrowed, very broadly branched and leafy *stem*, from two to four feet in height. The *leaves* are from three to four inches long, oblong-lanceolate, acuminate, entire, remote, tapering at the base, thin, minutely downy underneath, and scabrous above; the lower ones petioled. The *branches* are slender and remote, each terminating in a centrifugal, divaricate, dichotomous, hairy, paniculate raceme, leafy-bracted at the base. The *flowers* are very small, white or pale-blue, the pedicels nodding in fruit. *Fruit* convex, densely covered with prickles having barbed points. This plant is common throughout the United States, growing in rocky grounds and among rubbish, flowering in July.—*W.* The whole plant has an unpleasant odor. The root is the part used, and imparts its virtues to water. It is mucilaginous, tonic, and astringent, and has been found very efficacious in diarrhea and dysentery. From its excellent effects in these diseases, it has acquired the popular name of *Dysentery Root.* The root may be chewed, or given in powder or infusion, *ad libitum.* It will, probably, be found useful in other diseases, where such a combination of properties is indicated.

CYPRIPEDIUM PUBESCENS.

Yellow Ladies-slipper.

Nat. Ord.—Orchidaceæ. *Sex. Syst.*—Gynandria Diandria.

THE ROOT.

Description.—Cypripedium Pubescens is an indigenous plant, known by various names, as *American Valerian*, *Umbel*, *Nerve-Root*, *Yellow-Moccasin Flower*, *Noah's Ark*, etc.; its *roots* are perennial, fibrous, fleshy, undulated or crooked, long, about a line in diameter, and from which arise one or several round leafy *stems*, growing from twelve to eighteen inches high. The *leaves* are from three to six inches long, by two or three broad, sheathing, oblong-lanceolate, entire, veined, cauline, acuminate, pubescent, alternate, generally the same number on each side. *Flowers* large, very showy, terminal, solitary. *Segments* four. *Lobe of the style* triangular-oblong, obtuse; *sepals* ovate, oblong, acuminate; *petals* long, linear, contorted; *lip* shorter than the other petals, compressed laterally, very convex and gibbous above, pale-yellow, from one and a half to two inches long.—*B.*—*R.*—*W.*

Cypripedium Parviflorum, has been considered a distinct species by some botanists, and as a mere variety by others. It differs from the above, in having the *lobe of the style* acute, the *leaves* are broader, the *flowers* somewhat larger, and the *perianth* more brownish-purple in color.—*W.*

History.—This plant is found in most parts of the United States, in rich woods and meadows, flowering in May and June; its flowers are scentless. There are several varieties of it, all of which possess similar virtues, and the roots of which are undoubtedly collected, sold, and used with the officinal article indiscriminately. They are as follows:

1. *C. Spectabile*, or Showy Ladies-slipper, having crowded, ovate-lanceolate *leaves*, embracing each other; *lobe of the style* elliptic-cordate, obtuse; *sepals* broad-ovate, obtuse; *lip* longer than the petals, cleft before, white, striped with purple, two inches long, one and a half broad; *flowers* very large, two or three on each plant, appearing in June and July. The whole plant pubescent.—*W.*

2. *C. Acaule*, Low or Stemless Ladies-slipper, having a bulbous root with numerous fleshy fibers; *scape* leafless, one-flowered; *leaves* radical, in pairs, oblong, obtuse; *lobe of the style* round-rhomboid, acuminate, deflexed; *lip* longer than the lanceolate petals, cleft before, purple or white, nearly two inches long, veiny; *flowers* solitary, terminal, with a single, lanceolate bract at the base, and appearing in May and June.—*W.*—*B.*—*R.*

3. *C. Candidum*, Small White, or White-flowered Ladies-slipper, having a leafy *stem*, oblong-lanceolate *leaves; lobe of the style* lanceolate, somewhat obtuse; *lip* rather shorter than the lance-linear petals, white, about three-quarters of an inch long; *flowers* terminal, solitary. The plant is slightly pubescent, seldom growing above a foot in height; the flowers appear in May and June.—*W.*

4. *C. Arietinum*, or Ram's Head, having a leafy *stem;* elliptical, striate-veined, sessile, amplexicaul *leaves; lobe of the style* orbicular, somewhat obtuse; *lip* as long as the petals, saccate, obconic before, red, and white-veined, hairy at the orifice, about half an inch long; *perianth* greenish-brown. The *flowers* are mostly solitary with a leafy bract at base, and appear in May and June.—*W.*—*B.*—*R.*

The *C. Spectabile* and *C. Acaule*, are said to possess more narcotic properties than the others, especially when inhabiting dark swamps.

The fibrous roots of these plants are the parts used in medicine; they should be gathered in autumn, cleansed from dirt, and carefully dried in the shade. They have a peculiar, slightly bitter, and rather nauseous taste, and a somewhat unpleasant odor. As met with in the shops, they are composed of many long, fleshy, cylindrical fibers, of a pale-yellow color, matted together. Alcohol, or boiling water, takes up their virtues, which, however, are impaired by boiling. No analysis has been made of them.

Properties and Uses.—Tonic, stimulant, diaphoretic, and antispasmodic. Useful in hysteria, chorea, nervous headache, and all cases of nervous irritability; and combined with *Eupatorium Aromatica* and *Scutellaria Lateriflora*, it has proved beneficial in neuralgia, delirium, and hypochondria. The alcoholic extract is the best form of administration. Dose, from ten to twenty grains; tincture, from one to three fluidrachms; infusion, from one to four fluidounces; of the powder, one drachm in warm water, repeated as often as required. The following preparation has been used in sick or nervous headache, not dependent on acid stomach, in several hundred cases, by various practitioners: Take of nepeta cataria, scutellaria lateriflora, and Cypripedium Pubescens in powder, of each, half an ounce —pour on a pint of boiling water, and infuse for fifteen or twenty minutes; dose, one fluidounce of the warm infusion; after which, half a fluidounce, every half hour, for three or four hours, or until the headache ceases. Used thus, during three or four attacks of headache, it has, so far as I am informed, invariably effected permanent cures of this distressing complaint. An infusion is said to be beneficial in the pains of the joints following scarlet fever. Although considered by many practitioners superior to the foreign valerian, yet it will be found inefficient in many instances where the European article will prove beneficial.

Cypripedin is the name given to the impure active principle procured from the root; it may be obtained in the same manner as named for iridin and xanthoxylin. It possesses the properties of the root in a marked degree, and may be given in doses of from half a grain to two or even three grains.

Off. Prep.—Extractum Cypripedii Hydro-alcoholicum; Extractum Cypripedii Fluidum; Infusum Cypripedii; Tinctura Serpentariæ Composita.

CYTISUS SCOPARIUS.

Common Broom.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE FRESH TOPS AND SEEDS.

Description.—This is a large, bushy shrub, growing from four to nine feet high, with numerous, long, straight, pentangular, dark-green, smooth, tough, very pliant *branches.* The *leaves* are deciduous, scattered, stalked, ternate; the upper ones generally simple; the *leaflets* are uniform, obovate, obtuse, entire, silky when young. The *flowers* are axillary, solitary, or in pairs, on simple stalks, longer than the leaves, papilionaceous, large and handsome, of a deep golden yellow color. *Legume* brown, flat, above an inch long, nearly smooth at the sides, but fringed with hairs at each margin, and containing about fifteen or sixteen seeds. The swelling ovary soon splits the tube of the filaments.—*L.*

History.—This plant is common to Europe and this country, and is frequently cultivated in gardens; it grows on dry and sandy soils, and flowers in May and June. The tops and the seeds are the officinal parts; the latter may be preserved for a longer time than the former; all parts of the plant have a peculiar, nauseously amarous taste, and when rubbed have a singular odor. They contain oils, mucilage, albumen, etc., and yield their virtues to water or alcohol. The young blossoms when pickled, are said to be equal to capers.

Two principles have been procured from this plant by Dr. Stenhouse:

one in yellow, stellate crystals, and tasteless, called *Scoparin*, the supposed diuretic principle; the other a volatile, colorless liquid, of a bitter taste, called *Spartitine* or *Spartein*, the supposed narcotic principle.

Properties and Uses.—In large doses, emetic and cathartic; in small ones, diuretic. Used in dropsy; said never to fail in increasing the flow of the urine; especially beneficial in dropsy of the thorax combined with disease of the lungs. Dose, of a strong decoction, four fluidounces every hour until it produces some effect; of the pulverized seed, from ten to fifteen grains, aided by the free use of diluents. Seldom used in this country.

Off. Prep.—Decoctum Scoparii.

DAPHNE MEZEREUM.

Mezereon.

Nat. Ord.—Thymelaceæ. *Sex. Syst.*—Octandria Monogynia.

THE BARK.

Description.—Mezereon, or *Spurge Olive* is a weatherproof shrub, with a large *root*, and bushy *stem* four or five feet high, with upright, alternate, smooth, tough, and pliant *branches*, leafy when young, and a smooth dark-gray bark, which is not strongly attached to the wood. The *leaves* are terminal on the branches, scattered, stalked, lanceolate, smooth, deciduous, two inches long, appearing after the flowers, and soon accompanied by flower-buds for the next season. The *flowers* are highly fragrant, of a pale-rose color, seated in little clusters on the naked branches, with several brown, smooth, ovate bracteas underneath. *Calyx* tubular, hairy externally, like a corolla in texture, crimson all over; *limb* in four deep, ovate, spreading, colored segments. *Stamens* eight; *filaments* short, in two rows, from about the middle of the tube; *anthers* roundish-oblong, two-celled, simple, inclosed within the tube. *Ovary* superior, ovate; *style* short, terminal; *stigma* capitate, depressed, entire. *Berry* scarlet, pulpy, oval, one-celled, one-sided: *seed* suspended, oval, large, with a thin brittle skin.—*L.*

Daphne Gnidium is a small bush, with the *leaves* linear-lanceolate, clustered, acuminate, cuspidate, quite smooth. The *flowers* are numerous, small, white, downy, fragrant, and in terminal panicled racemes. The *fruit* is globular, dry, at first green, but ultimately black.—*L.*

Daphne Laureola or Spurge-laurel, is a smooth plant, with a stem two or three feet high, and round, pale, brown, upright, tough and pliant *branches*, crowned with tufts of evergreen *leaves*, elegantly drooping in all directions, and about two or three inches long, lanceolate, glabrous, acute, entire, subsessile. *Flowers* deep-green, with orange anthers, four of which are just visible in the throat of the calyx, five together in each axillary raceme. An oval, concave *bract* accompanies each short partial stalk, at the base. *Berry* oval, black.—*L.*

History.—All the species of Daphne possess active properties, but the bark met with in commerce is usually obtained from the three above des-

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cribed, that from the latter being less active than the others. The *D. Mezereum* is a native of the northern parts of Europe, where it is cultivated both as a medicine and an ornament; it flowers very early in the spring, often before the snow has disappeared. The *D. Gnidium* is found in the south of France on hills and barren plains, and its bark is employed equally with that from the other kinds. The bark of the root is the officinal part, but much that is obtained in the shops is derived from the stem. The *D. Mezereum* is the most active plant of the genus; its bark is generally collected in the spring. It is met with in flat or quilled pieces, a few feet in length, and from eight to twelve lines in breadth, and put up in packages which are often globular. Externally it is olive-colored or brownish, and corrugated; internally whitish, cottony and cohesive; its odor when dry is very feeble, and its taste sweetish, followed by an acrid burning sensation in the mouth and fauces. Alcohol takes up its virtues; also water by boiling. Oils or fats boiled with it, likewise take up its active principles and form ointments. It contains daphnin, wax, an acrid resin, a trace of volatile oil, yellow coloring principle, uncrystallizable but fermentable sugar, nitrogenous gummy matter, reddish-brown extractive, woody fiber, free malic acid, and malates of potassa, lime, and magnesia.—*P.*—*Gmelin* and *Bär*.

Daphnin is not the principle to which Mezereon owes its active properties, it forms in colorless crystals, but little soluble in cold, and readily so in boiling water, is soluble in alcohol and ether, odorless, and of a bitter, slightly astringent taste. It may be obtained by mixing the alcoholic solution of the bark with water, distilling off the alcohol, and precipitating the residual liquid with acetate of lead. Wash the precipitate with cold water, precipitate the lead by sulphureted hydrogen, filter, evaporate to dryness, digest the residual matter in cold absolute alcohol, and leave this alcoholic solution to evaporate spontaneously.—*T.* The active principle of the bark is very probably a volatile oil which becomes oxidized forming an *acrid resin*, and which may be obtained by boiling the bark in alcohol, and when the liquid is cool, filter, evaporate, and wash the residual extract with water. The resin which is deposited is dark green, brittle, very acrid, and soluble in alcohol or ether. It is probably composed of a resin, and an acrid oil.—*P.*—*Squire*. Mr. Squire states that Mezereon contains a volatile acrid substance which is carried off by the vapor of water, but not by that of alcohol. When boiled with water some of the acrid principle of Mezereon bark passes off, which is not the case when boiled with alcohol.

Properties and Uses.—In large doses, Mezereon is an irritant poison, causing redness and vesication of the skin when left in contact with it, and causing, when swallowed, dryness and burning of the throat, vomiting, hypercatharsis, and frequently renal irritation. The berries have proved fatal to children who have eaten them; yet in some countries they are used as a purgative, in doses of eight to twelve. In small doses it acts as a stimulant, alterative, diuretic, diaphoretic in warm decoction, and cathartic. It acts favorably in syphilis, mercurio-syphilis, scrofula, chronic rheumatism, and some forms of obstinate disease of the skin. Dose of the decoction, from one to three fluidounces; of the powder 10 grains.

Externally, it is used occasionally; sometimes employed by practitioners to produce rubefaction and vesication, and in the form of ointment as an application to blistered surfaces, indolent ulcers, and issues, in order to excite suppuration. When vesication is desired, the bark is soaked in hot vinegar and water to soften it, and then applied to the part by a compress and bandage. The application is to be renewed night and morning, until vesication is produced.—*P.*

Off. Prep.—Decoctum Sarsaparillæ Compositum; Unguentum Mezerei.

DATURA STRAMONIUM.

Stramonium.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND SEEDS.

Description.—This plant, also known by the names of *Thorn Apple*, *Jamestown Weed*, *Stinkweed*, *Apple-peru*, etc., is a bushy, smooth, fetid, annual plant, two or three feet in height, and in rich soil even more; the *root* is rather large, of a whitish color, giving off many fibers. The *stem* is much branched, forked, spreading, leafy, of a yellowish-green color. The *leaves* are from the forks of the stem, large, ovate, smooth, unequal at the base, variously and acutely sinuated and toothed, veiny, dark-green above, paler beneath. The *flowers* are large, axillary, erect, white, about three inches long. The *corolla* is funnel-shaped, regular, angular, plaited, with five mucronate lobes. *Calyx* oblong, five-angled, five-toothed, dropping off from its base by a circular horizontal incision, which remains permanently at the base of the ovary. *Stamens* five; *anthers* erect, oblong; *style* filiform; *stigma* thick, obtuse, bilobed. *Ovary* free, oval, hairy, four-celled. *Fruit* a large, dry, prickly capsule, ovate, half four-celled, with four valves, and numerous black, reniform seeds, attached to a longitudinal receptacle which occupies the center of each cell.—*L.*

Datura Tatula, or purple Stramonium, differs from the above, in having its stem purplish, or dark-red, and with minute green punctations, and its flowers of a dull deep purple at the angles, and purple stripes inside.

History.—Stramonium is a well-known poisonous weed, growing in all parts of the United States, along road-sides, waste grounds, etc., and flowering from July to September. Its native country is unknown. It is found growing in Asia, Europe, Canada, Mexico and Peru. The whole plant has an unpleasant, fetid, narcotic odor, which diminishes upon drying. Almost every part of the plant is possessed of medicinal properties, but the officinal parts are the leaves and seeds. The *leaves* should be gathered when the flowers are full blown, and carefully dried in the shade. They have a rank odor when fresh, especially if bruised, which is lost on drying, and a mawkish, amarous, nauseous taste. They impart their properties to water, alcohol, and the fixed oils. Water distilled from them slightly possesses their odor, but does not contain their active properties. They consist, according to Promnitz (1815), of resin, extractive (containing daturia), gummy extractive, green fecula, albumen, phosphatic and vegetable salts of lime and magnesia, water and woody fiber. The *seeds* are small, reniform, compressed, roughish, dark-brown or black when ripe, grayish-brown when unripe, odorless, similar in taste with the leaves, with some acridity. When bruised they emit the peculiar heavy odor of the herb; they should be gathered when ripe. According to Brandes (1820), they contain malate of daturia with some uncrystallizable sugar, fixed oil with some chlorophylle, wax, resin insoluble in ether, extractive, gummy extractive, gum and bassorin with some salts, albumen and phytocolla, glutenoin, malates of daturia, potassa, and lime, and acetate of potassa, woody fiber, and water. Spirit, water, and fixed oils take up their active properties.

Daturia may be obtained by exhausting the bruised seeds with boiling rectified alcohol, and then proceeding as for the active principle of hyoscyamus. It is in glossy, colorless, tuftiform crystals, without odor, of a bitter, tobacco-like taste, an alkaline reaction, fusible at 212°, and sublimes at a higher heat, without change. It is soluble in 280 parts of cold water, in 72 of boiling, in 21 of ether, and in three parts of alcohol, and can be obtained in colorless, prismatic crystals, by adding water to its alcoholic solution. It forms crystalline salts with acids, is highly poisonous, and is obtained in very minute quantity from the seeds, only one-fiftieth of one per cent. being the maximum amount.—*Bastick.*

Dr. A. Von Planta declares that daturia is identical with atropia, the formula of each being—atropia, $C_{34} H_{25} NO_6$; daturia, $C_{34} H_{23} NO_6$. —(*Am. Jour. Pharm.*, XXIII., 38.)

An empyreumatic oil of a poisonous character has been obtained from Stramonium plant by submitting it to destructive distillation.—(*Morries, Ed. Med. and Surg. Jour.*, XXXIX., 379.)

Properties and Uses.—In large doses, an energetic, narcotic poison, producing dryness of the throat, thirst, nausea, giddiness, nervous agitation, dilatation of the pupil, obscurity of vision, headache, disturbance of the cerebral functions, perspiration, occasional relaxation of the bowels, and in some cases diuresis.—*P.* When about to prove fatal, maniacal delirium, loss of voice, dryness of throat, etc., are usually present. In medicinal doses it acts as an anodyne-antispasmodic, without causing constipation, and will prove serviceable in cases where opium can not be given. It has proved serviceable in mania, epilepsy, gastritis, and enteritis, and may likewise be used to allay rheumatic, syphilitic, and neuralgic pains. In combination with quinia, it forms an invaluable preparation which has been found exceedingly beneficial in intermittent fever, all periodic pains, headache, dysmenorrhea, delirium tremens, etc. The leaves, dried and smoked, are said to be useful in spasmodic asthma, but we do not recommend them, having more efficient means to cure this disease. It is said that the seeds exert an influence, to prevent abortion, superior to any thing else; seven seeds to be given at first, after which, one every hour, as may be required.

In plethoric habits, and in patients with determination to the head, Stramonium must be administered with caution, keeping the excretory organs, as the skin, kidneys, and bowels, in an active condition during its employment. Externally, a poultice of the fresh leaves, bruised, or the dried leaves in hot water, will be found an excellent application over the bowels, in severe forms of gastritis, enteritis, peritonitis, etc. I have in many instances applied them to the perineum, in cases of retention of urine from enlarged prostate, where it was impossible to introduce a catheter, and, after having allowed them to remain for about half an hour, have been enabled to pass the catheter with ease and facility, and thus afford relief to the patient. I have met with similar good results in urethral stricture. It will also be found beneficial as a local medication to all species of painful ulcers, acute ophthalmia, swelled breasts, inflammatory rheumatism, and hemorrhoidal tumors. An ointment of it is very valuable in many of the above diseases. In cases where the leaves can not be obtained, a plaster of the alcoholic extract or inspissated juice may be applied over the affected parts; or the extract may be rendered thin by heating it in diluted alcohol, and then formed into a poultice with meal or moistened bread and applied. In the absence of belladonna, the extract of Stramonium may be mixed with lard, and rubbed over the eyelid, or a solution of it dropped into the eye, in order to produce dilatation of the pupil, previous to the operation for cataract; it is equally efficacious with this agent. Dose of the powdered leaves or seeds, from one to five grains; of the extract, which is the best form of administration, from one-eighth of a grain to two grains; of the tincture, for which the seeds, bruised, are preferable, from five to thirty drops.

Daturia is seldom employed in medicine; it is a very energetic poison, one-eighth of a grain having killed a sparrow in three hours, and nearly proved fatal to a cat, when applied to the eye. Very minute quantities applied to the eye occasion protracted and excessive dilatation of the pupil. In cases of poisoning by Stramonium, the best mode of obtaining relief is to evacuate the stomach by emetics or the stomach-pump, after which vinegar and water may be used, with mucilaginous drinks at a later period, and strong coffee, tea, and other stimulating drinks, if there is much prostration. Magneto-electricity may also be useful. According to Garrod, caustic alkalies destroy the active principle of Stramonium, but not their carbonates.

Off. Prep.—Cataplasma Stramonii; Extractum Stramonii Alcoholicum; Tinctura Stramonii; Tinctura Viburnii Composita; Unguentum Stramonii; Unguentum Stramonii Compositum.

DAUCUS CAROTA.

Wild Carrot.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT AND SEEDS.

Description.—Wild Carrot is a biennial herb, with a slender, yellowish, aromatic, spindle-shaped and sweetish *root.* The *stems* are two or three feet high, round, branched, erect, furrowed, leafy, hairy, or bristly. The *leaves* are alternate, on broad, concave, ribbed footstalks, bipinnate, cut, narrow, acute, distantly hairy; *leaflets* linear, acute. The *flowers* are small, white or cream-colored, except the one central, neutral flower, which is blood-red. *Umbels* terminating the long, leafless branches, solitary, large, dense, concave, many-rayed. *General involucre* pinnatifid, slender, large, but not so long as the umbel; *partial involucre* undivided, or partly three-cleft, membranous at the edges; *petals* five, obovate, emarginate, with an inflected point. *Fruit* small, oval, somewhat compressed, pale dull-brown; *half-fruits* or *mericarps* with the five primary ridges filiform and bristly, the three middle ones at the back, the lateral on the plane of the commissure; the *four secondary* equal, more prominent, winged, split into a single row of spines. *Vittæ* solitary in the channels below the secondary ridges.—*L.*—*W.*—*G.*

History.—Wild Carrot is indigenous to Europe, and is extensively naturalized in this country, growing in old fields and by roadsides, flowering from June to September. By cultivation it becomes somewhat changed, as in the Garden Carrot. The root of the wild variety, and the seeds of both kinds are officinal. The *seeds* or mericarps are oval, with plano-convex surfaces, slightly ciliated, and marked with five ridges, from a line to a line and a half long, of an agreeable, aromatic smell, and a moderately pungent, bitter taste.—*Ed.* Their medicinal properties are owing to a volatile oil, which is colorless, or slightly tinged with yellow, and which may be procured by distilling them with water. They yield their virtues by infusion, to water, at 212° F.; boiling dissipates them. The seeds have not been analyzed.

The *root* is fusiform, slender, yellowish-white, occasionally branched, rather woody, possessing a peculiar aromatic odor, and an unpleasant, bitterish taste, with some acrimony. The root of the Garden Carrot is fusiform, from nine to twelve inches in length, white, orange, yellow, or reddish-colored, transversely wrinkled, with scattered radicles, having a reticulated bark, a fleshy parenchyma, and a round or angularly radiated medulla; they are quite thick, have an agreeable, peculiar odor, and a rather pleasant, saccharo-mucilaginous taste. According to Wackenroder, the expressed juice of Carrot root contains fixed oil, with some volatile oil, carotin, uncrystallizable sugar, with some starch and malic acid, albumen, ashes composed of alumina, lime, and iron. The *volatile oil* is of sp. gr.

0.8863 at 54° F., is very soluble in alcohol or ether, less so in water, is colorless, and has the odor and strong taste of Carrots. *Carotin* is a ruby-red crystalline, tasteless, odorless, neutral substance, fusible, combustible, soluble in fixed and volatile oils, slightly so in alcohol, not in ether, and its solutions are not decolorized by solar light.—*P.*

Pectin, or vegetable jelly, is found universally scattered over the vegetable kingdom, being in considerable quantity in many fruits, roots, etc. It may be obtained from all fruits by digesting them in alcohol, and leaving the solution for a couple of days to spontaneous evaporation, when the pectin is deposited in a gelatinous coagulum; to obtain it in purity, subject it to gradual pressure, and wash it with weak alcohol. It is translucent like isinglass, swells up in 100 parts of cold water, forming a mass like starch, but not colored blue by iodine; boiling water has less action upon it than cold. The least trace of a fixed alkali instantly converts it into pectic acid, forming a pectate of the alkali; the addition of another acid decomposes it, and sets the pectic acid free. Pectic acid has the form of a transparent and colorless jelly, with a perceptible acid taste, reddens litmus, and forms salts with alkalies.—*T.*

Properties and Uses.—Both the root and seeds are stimulant and diuretic. Used in infusion with much success, in dropsy, chronic nephritic affections, and gravel. Also as a carminative, and to relieve strangury from cantharides. Externally, scraped or grated, it forms an excellent application as a poultice to phagedenic, cancerous, malignant and indolent ulcers—relieving the pain, correcting the fetor, lessening the discharge, and altering the morbid condition of the parts. Dose of the infusion, from two to four fluidounces, three or four times daily.

Off. Prep.—Cataplasma Dauci; Infusum Dauci.

DELPHINIUM CONSOLIDA.

Larkspur.

DELPHINIUM STAPHISAGRIA.

Stavesacre.

Nat Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Trigynia.

THE ROOT AND SEEDS.

Description.—Delphinium Consolida is an annual herb, with a simple, slender *root*, and a suberect, leafy *stem*, from a foot and a half to two feet high, with alternate spreading *branches*. The *leaves* are sessile, in many deep divisions, which are three-cleft, and subdivided into narrow linear acute segments. The *flowers* are bright blue or purple, in terminal, lax, few-flowered racemes; *bracts* simple or divided, longer than the pedicels. *Corolla* monopetalous; two spurs combined in one. *Carpels* solitary, smooth, follicular; *seeds* numerous, dark-brown or black, angular, very rough.—*L.*

Delphinium Staphisagria is an elegant, stout, upright herb, and about the same height as the preceding; the stems and petioles are hispid, with long, soft hairs. The *leaves* are broad, palmated, petioled, five to nine cleft. The *flowers* are bluish gray, in terminal, lax racemes, with hairy pedicels at least an inch long, and bracts inserted at their base. The *petals* are five, dirty-white, the two lower spathulate. *Spur* hardly two lines long. *Capsules* three, large, villous, containing many globose, three-cornered, thick, black *seeds*.—*L.*

History.—The *Delphinium Consolida* is a native of Europe, which has become naturalized in the United States, growing in woods and fields, and in June and July. The flowers of the wild plant are blue; of the cultivated blue, red, or white. The whole plant contains an acrid principle, more abundant in the seeds. The seeds furnish considerable oil; and a blue pigment is obtained from the flowers, which is rendered permanent by alum. Diluted alcohol is its best solvent.

The *D. Staphisagria* is a native of the south of Europe, growing in waste places; the seeds are the officinal part. They are about the size of rye-grains, somewhat triangular, sometimes quadrangular, slightly arched, blackish-brown and wrinkled externally, and containing a white, oily nucleus; their odor is faint, but unpleasant, and their taste acrid, bitter, pungent, and disagreeable. They yield their properties to water or alcohol.—*P.*—*T.*

The seeds of the D. Consolida contain *delphinia*, volatile oil, fixed oil, gum resin, chlorophylle, gallic acid, and salts of potassa, lime and iron. Those of the D. Staphisagria contain a brown and a yellow bitter principle, brown bitter matter, yellow bitter matter, fatty oil, volatile oil, gum, uncrystallizable sugar, albumen, mineral salts, malate of delphinia, etc. Wicke obtained *itaconic acid* from D. Consolida by the following process: "The expressed juice of the plant was boiled for about half an hour to separate the albumen and chlorophylle, strained, oxalic acid added to separate lime, the filtrate treated with acetate of lead; the lead salt decomposed by sulphureted hydrogen, and these two operations repeated until a tolerably colorless liquid was obtained, it being very difficult to separate the coloring substances. This liquid, evaporated to dryness, was treated with ether, when the aconitic acid was obtained on evaporation in the form of warty masses of crystals, which were readily soluble in alcohol and water. When heated in a tube these distilled off drops of a liquid which crystallized (itaconic acid) and a voluminous coal remained."

The alkaloid, *Delphinia*, may be obtained by digesting the seeds in water acidulated with sulphuric acid, and precipitating the acid liquid by an alkali or magnesia. Wash and dry the precipitate, and digest it in boiling alcohol, which will dissolve the delphinia. Treat the solution with ivory black, filter, and precipitate the delphinia by ammonia; dissolve this in alcohol, and the alkaloid is obtained in the form of powder.

It is odorless, has a slight amber color, an acrid, persistent taste, fuses at 248°, soluble in alcohol or ether, slightly so in water, and forms salts, with the acids. As usually procured, it contains a resinous matter, and an acrid resin, which M. Couerbe calls *staphysain.*—*T.*

Properties and Uses.—The D. Staphisagria possesses the same properties as the D. Consolida, but in a higher degree. In large doses they are irritant poisons; in medicinal doses the former is emetic, cathartic, and narcotic, but its action is too violent and uncertain for these indications. An infusion of the seeds of Stavesacre, may, however, be advantageously used both by the mouth and in injection, as a vermifuge. The powdered seeds mixed with lard have been found useful in some forms of cutaneous disease, and to destroy lice in the hair ; a tincture, or infusion of the bruised seeds in vinegar may be employed for the same object. The seeds have likewise been used in some countries to intoxicate fish.

The flowers of the D. Consolida are considered diuretic, emmenagogue, and vermifuge; they were formerly used as a local application to wounds, and the decoction was recommended as efficacious in some ophthalmic affections. The seeds possess similar properties with those of the D. Staphisagria, but less energetic. A tincture of them has been recommended in calculus, as a vermifuge, and to destroy lice in the hair; it has also been found useful in spasmodic asthma and dropsy. It is made by adding two ounces of the seed to a quart of diluted alcohol, of which ten drops may be given three times a day, gradually increasing the quantity until the system is influenced by it. The root possesses similar virtues, but is seldom employed. A drachm of two of the flowers of D. Consolida, placed in a pint of hot water, and slowly simmered down to half a pint, then strained and sweetened, is said to be an excellent remedy for cholera morbus; to be administered in teacupful doses, at short intervals, until relief is obtained. As an anti-emetic in the vomiting of autumnal fevers and other diseases, this plant is highly extolled, calming the stomach speedily, and giving a delightful relief; it is used in infusion, made similar to the above, by adding half an ounce of the leaves and flowers to half a pint of boiling water. The dose is a wineglassful, to be repeated every half-hour or oftener, if necessary. This plant undoubtedly deserves further investigation.

Delphinia possesses the peculiar properties of the seed in an eminent degree. It is very poisonous, expending its force more especially upon the brain and nerves; six grains of it dissolved in vinegar killed a dog in forty minutes,—the symptoms are vomiting, giddiness, and convulsions. Dr. Turnbull states that pure delphinia may be given in doses of half a grain, to the extent of three or four grains a day, without any unpleasant results; it sometimes purges, mostly promotes diuresis, and occasions feelings of heat and tingling in various parts of the body. If used at all, it should be with excessive caution. Externally, it has been successfully used in neuralgia, rheumatism, and paralysis; it is applied by friction over the part in the form of ointment or alcoholic solution, in proportions varying from ten to thirty grains of delphinia to one ounce of the vehicle; and the friction should be continued till some redness and burning are produced.

DIERVILLA CANADENSIS.

Bush Honeysuckle.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Monogynia.

ROOT, LEAVES AND TWIGS.

Description.—This plant, the *Diervilla Trifida* of Mænchausen, and sometimes called *Gravelweed*, is a low shrub, with a branching, pithy *stem*, about two or three feet high. The *leaves* are from two to four inches long, by one to one and a half broad, ovate, acuminate, finely serrate, opposite, deciduous, on short petioles. The *peduncles* are axillary and terminal, dichotomous, and from one to three-flowered; *flowers* greenish-yellow. The *calyx tube* oblong, *limb* five-cleft, with two bracts; *corolla* twice as long as the calyx, greenish-yellow, five-cleft, funnel-shaped; *border* five-cleft, spreading. *Stamens* five, which with the style are much exserted. *Stigma* capitate. *Capsule* oblong, attenuate above, two-celled, naked with many seeds.—*W.*

History.—This is a woody shrub, growing in the United States from Canada to Carolina, in hedges and thickets, and by the sides of fences and rocks, flowering in June. The leaves, twigs, and roots are the parts used, and yield their properties to alcohol, and boiling water in infusion.

Properties and Uses.—Diuretic, astringent, and alterative. A cold infusion of the bruised leaves and twigs, used freely, has been very beneficial in inflammation of the bladder with gravelly deposit in the urine, in nephritic and calculous affections, and in gonorrhea. The root is said to be a superior article, in decoction or syrup, for the cure of syphilis. Externally, applied to erysipelas, or erysipelatous inflammations, and over the inflamed surface occasioned by the *rhus*, ivy or poison vine, it soon relieves the itching, burning, inflammation and swelling.

Off. Prep.—Infusum Diervillæ.

DIGITALIS PURPUREA.

Foxglove.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES.

Description.—Foxglove is a handsome biennial plant, with a whitish *root* of numerous, long and slender fibers. The *stem* is straight, wand-like, leafy, mostly simple, roundish, with several slight angles, downy, three or four feet high. The *leaves* are alternate, ovate or elliptic oblong, crenate, downy, rugged and veiny, of a dull green, tapering at the base into winged footstalks; radical ones largest. The *flowers* are numerous, large, pendulous, scentless, crimson, elegantly marked with eye-like spots and hairy within, and are in terminal, one-sided, erect, simple racemes. The *corolla* is monopetalous, campanulate, ventricose, contracted at the base, with an oblique limb; upper lip emarginate; lower, trifid, with the middle lobe the largest. *Calyx* of five acute sepals, permanent, much shorter than the corolla; the uppermost narrowest. *Stamens* didynamous, inserted into the base of the corolla; *anthers* large, acute, naked; *style* simple; *stigma* bilamellate. *Capsule* ovate, sharp-pointed, with a septicidal dehiscence; *seeds* many, small, grayish-brown, pitted, oblong.—*L.*

History.—Foxglove is indigenous to Europe, and has been introduced into the United States, where it flowers in June and July. The officinal part is the leaves, though the seeds will be found much more efficient. The leaves should be collected while the plant is in bloom,—Duncan says "before their inflorescence,"—selecting only those which are fully developed, and separating from them the inert petioles and mid-veins; they should then be dried by exposure to a current of dry air, by being placed in a drying stove, or by being inclosed in a hot-air press. Much care is necessary in preserving them for medical purposes, or else they will prove inefficient. When well prepared, the powder has a fine green color, and retains the intense bitterness of the fresh leaves. The leaves, when dried or in powder, should be placed in opaque, well closed vessels, to protect them from the deleterious influence of dampness and solar light; and the drug should be renewed annually, as it loses its virtues by age. The mode of compressing the leaves into a dense cake, as pursued by the Shakers, is by no means to be recommended, as the internal portions of these cakes are very apt to become moldy. Fresh Foxglove leaves have a slight virose odor, which by desiccation becomes feebly narcotic, with an acrid, bitter, disagreeable taste, and a dark-green color. Their properties are yielded to alcohol, ether, water, or diluted acids. A solution of sesquichloride of iron added to infusion of Digitalis renders it dark greenish-black; tincture of galls causes a gray precipitate; when triturated with lime, the leaves give out ammonia.

Nativelle found in the leaves of Digitalis, *digitalin* combined with tannic acid, a crystallizable substance, aromatic principle, crystallizable resinous matter, fixed oil, sugar, red coloring matter soluble in water, chlorophylle, extractive, albumen, and salts containing vegetable and inorganic acids. Morin found volatile antirrhinic acid, and digitalic acid.—*P.* The leaves submitted to destructive distillation yield an empyreumatic oil, semi-solid at 60° F., and soluble in boiling alcohol and ether.—*Ed. Med. and Surg. Jour., XXXIX.*, 377.

Wittstein gives the following formula for preparing *Digitalin:*

"A quantity of the coarsely powdered leaves of Foxglove are digested with eight times their weight of alcohol of 80 per cent., at the ordinary temperature for some days, the residue pressed, washed with a little alcohol, filtered, and most of the alcohol distilled from it, the contents of the retort evaporated to the consistence of an ordinary extract, and treated with a mixture of one part of concentrated acetic acid and thirty parts of water, in a water-bath. The acetic acid solution is agitated with animal charcoal that has been purified by digestion with hydrochloric acid; then filtered, neutralized with ammonia, and precipitated with an aqueous solution of tannic acid, the precipitate collected on a filter, exhausted with water, rubbed with about one-sixth its weight of finely powdered oxide of lead, and dried in a water-bath. The dried mass is finely powdered, exhausted with alcohol 90 per cent., and filtered; the filtrate treated with animal charcoal, and slowly evaporated in a water-bath. When all the alcohol is removed, and the residue becomes nearly dry, it is rinsed a few times with pure water, thoroughly dried, shaken with ether, the ether poured off, and the residue dissolved in warm alcohol of 90 per cent., then slowly evaporated. The yield is about $\frac{1}{70}$ or $\frac{1}{80}$ the weight of the dried leaves used.

"To obtain a good yield and pure digitalin, it is necessary to employ as small an amount of heat as possible. Alcohol readily dissolves digitalin at the ordinary temperature, but at the same time takes up extractive matter, etc., which gives the tincture a dark color. Acetic acid dissolves from the alcoholic extract all the digitalin, and but a part of the coloring matter, which last is almost entirely removed by animal charcoal. After the acetic acid has been neutralized by ammonia, tannic acid precipitates the digitalin, and in order to free it from the precipitant, the latter is combined with oxide of lead, with which it forms an insoluble compound. From the residual extract of the alcoholic solution, water takes up only a trace of extractive matter; ether, some other impurities, with only a trace of digitalin. After dissolving in alcohol, and allowing this to evaporate very slowly, the digitalin is obtained quite pure."

Digitalin forms white, odorless, warty masses, of a persistent bitter taste, which is but slowly perceptible from its insolubility. Its dust excites violent sneezing. When heated gradually, it first melts, evolves acid vapors, ignites, and finally is consumed without residue. It is neutral and contains no nitrogen, and is soluble in 2,000 parts of water at 60° F.; in 1,000 parts at 212° F.; in 288 parts of ether sp. gr. 0.750, and 1,250 parts of ether sp. gr. 0.726; it is readily soluble in alcohol, the more so the stronger and warmer the latter is. With potassa it gradually loses its bitter taste. It prevents fermentation in an aqueous solution of sugar, and is probably a poison to beer yeast. Concentrated hydrochloric acid rapidly dissolves it to a yellow liquid, which becomes emerald-green, and gradually of a deep green, while, finally, green flakes are deposited. Concentrated sulphuric acid gives a blackish-brown solution, which after several days becomes brownish-red, amethyst gray, finally cochineal red, and on diluting with water acquires a green appearance.

Properties and Uses.—In single large doses, Digitalis is an irritant-narcotic poison, producing gastro-intestinal irritation, nausea, vomiting, and very abundant alvine evacuations. Its action is afterward spent upon the nervous system, causing vertigo, dimness of sight, delirium, convulsions, or a general debility, and finally death.—*E. & V.* A slow, feeble, irregular pulse and suppression of urine are generally present. When given in medicinal doses, too long continued, or in quantities to exert an immediate action on the system, it causes an increased discharge of urine, reduces the pulse from seventy beats in a minute to thirty, with languor, nausea, occasionally anxiety and salivation, a sense of weight or constriction, obtuse pain in the head, giddiness, disordered vision, mental disturbance, and rarely spectral illusions; not unfrequently a huskiness of the voice is present, the result of irritation of the fauces, trachea, etc. And if the use of the remedy be persisted in, these effects will continue to increase, until the poisonous symptoms, first referred to, become developed. In medicinal doses, Foxglove is sedative and diuretic, and may be employed with advantage in febrile diseases, acute inflammations, insanity, neuralgia attended with irritative fever, asthma, hemoptysis, hooping-cough, palpitation of the heart, epilepsy, and as a diuretic in dropsy, connected with diseased heart or kidneys. It should always be used with care, on account of its *cumulative* effect, which may otherwise occasion an unexpected fatality. When its constitutional effects become obvious, the exhibition of the remedy should be omitted from time to time, in order to guard against the results of this alarming accumulation. When its sedative effect is too great, it is best counteracted by the use of wine and opium conjointly. The dose of Digitalis in powder is from half a grain to a grain and a half, repeated every four or six hours; of the tincture from ten to thirty minims.

The poisonous effects of Digitalis are best counteracted by first evacuating the stomach by the free use of warm liquids, if any of it is supposed to remain in the stomach, and then administering brandy, wine, ammonia, or other stimulants, with sinapisms to the wrists and ankles. A solution of tannic acid might be of service, by forming an insoluble tannate of digitalin. Digitalin produces similar effects on the system with Digitalis, but its internal administration is hazardous, and demands much care and prudence. From one-fiftieth to one-sixtieth of a grain in syrup, or in a pill mass, may be given for a dose, if it be found desirable to use it,—cautiously increasing to an amount not to exceed the sixteenth of a grain.

Off. Prep.—Tinctura Digitalis.

DIOSCOREA VILLOSA.

Wild Yam.

Nat. Ord.—Dioscoreaceæ. *Sex. Syst.*—Diœcia Hexandria.

THE ROOT.

Description.—This plant, sometimes called *Colic-root*, is a delicate, twining vine, with a perennial root, from which proceeds a smooth, woolly, reddish-brown *stem*, one or two lines in diameter, and from five to fifteen feet long. The *leaves* are from two to four inches long, about three-fourths as wide, mostly alternate, occasionally nearly opposite or verticillate in fours, broad-ovate, distinctly cordate and acuminate, nine to eleven-veined, margin entire or wavy, villose with short, soft hairs on the lower surface, and glabrous on the upper. The *petioles* are elongated, the lowest somewhat verticillate in fours, the next subopposite, and the middle and upper alternate, and from two to four. The *flowers* are diœcious, very small, of a pale-greenish yellow color, and in axillary panicles or racemes. The *sterile flowers* have six stamens inserted on the base of the divisions of the six-parted perianth; *anthers* introrse, with the spikes paniculate; the fertile flowers have the ovary adherent, with three styles, and simple spikes. *Peduncles* axillary. *Ovaries* at first elliptic, but finally almost as broad as long, about three-fourths of an inch in length, three-celled, loculicidally three-valved by splitting through the winged angles. *Seeds* one or two in each cell, flat, with a membranaceous margin.—*W.*—*G.*

History.—This is a slender vine, twining over bushes and fences, in thickets and hedges, and flowering in June and July. It is a native of the United States and Canada, being, however, more common southward, and rare in the New England States. The root is the officinal part, it is long, branched, crooked, woody, of a white color internally, light-brown externally and wrinkled longitudinally, with many fine, long, tough, elastic, scattering fibers, having a short, granular fracture, the fractured surface appearing under the microscope white, pithy, and dotted with numerous light yellow resinous-like spots. It is inodorous, except when bruised, then it emits a faint, peculiar smell; its taste is pleasantly bitterish, sweetish, sub-mucilaginous, and slightly pungent. As met with in the shops the root is in pieces of various lengths, and from three to nine lines in diameter; it is not easily pulverized, flatting out when this is attempted. Water or alcohol are its solvents. No analysis has been made of this root, further than to extract its active constituent, *dioscorein*.

DIOSCOREA LÆVIUSCULA, Wood (*D. Quaternata of Pursh*), is a variety of the preceding, differing from it in its leaves, which are round and not cordate at base, smooth on both sides, margin slightly wavy. The dried root differs from the above in the following characters; it is more knotty and contorted, with rather more fibers; its color is ash-brown externally, and the bark is hardly, if at all, wrinkled; its diameter is likewise greater, and has a faint earthy odor when fractured or bruised, together with the bitterishness and flavor of the preceding, but devoid of sweetness. It is supposed to possess properties similar to those of the officinal root, but no satisfactory trials have been instituted. As it can be obtained in great abundance, while the *D. Villosa* is quite scarce, our practitioners would do well to test its value in bilious colic.

Properties and Uses.—Antispasmodic. Successfully used by physicians in bilious colic in doses of half a pint of the decoction, repeated every half-hour or hour; in fact, no other agent seems necessary in this disease, as it gives prompt and permanent relief in the most severe cases. It will likewise allay nausea, also spasms of the bowels, and, combined with equal parts of the bark of *Cornus Sericea* in decoction, is eminently beneficial in the nausea and vomiting of pregnant women. In ordinary cases the decoction of the root may be given in doses of from two to four fluidounces, and repeated every half-hour until relief is obtained. The tincture is said to be a valuable expectorant and diaphoretic, and in large doses produces emesis. Dose of the tincture from twenty to sixty drops.

Off. Prep.—Decoctum Dioscoreæ; Dioscorein.

DIOSCOREIN.

THE RESINOID PRINCIPLE OF THE ROOT OF DIOSCOREA VILLOSA.

Preparation.—Make a saturated tincture of the powdered roots of Dioscorea Villosa, and filter; add the tincture to its weight of water, and carefully distill off the alcohol; the Dioscorein will be left behind in the water; collect, dry, and pulverize it. It is prepared similarly to cimicifugin, leptandrin, podophyllin, etc.

History.—The profession are indebted to W. S. Merrell for the preparation and introduction of this highly valuable agent; it having been discovered by him in the winter of 1852–3. It forms a light yellowish-brown powder of a faint smell, and a slightly sweetish, resinous, very bitter, disagreeable taste, with a persistent acridity which is very sensibly felt in the throat and fauces. When exposed to the atmosphere it absorbs moisture, becomes darker colored, tenacious, of a pilular consistence, and leaves a light-yellowish greasy stain on white paper in which it is kept. It has neither acid nor alkaline reactions. When first prepared it is wholly soluble in alcohol, but on keeping for a time is only partially dissolved; in this respect it resembles podophyllin and several other resinoids, which, though completely taken up by alcohol at first, become less soluble in this menstruum by age; probably owing to an oxidizing of the resinoid by the action of the atmospheric oxygen. It is partly soluble in water, and insoluble in oil of turpentine. Ether very slightly dissolves it, and ammonia added to the ethereal mixture forms a dark-reddish turbid solution, with the ether floating on the top of a light straw color. Chloroform produces with it a dark, muddy solution, which becomes light brown on the addition of ammonia, and if permitted to stand for ten or fifteen minutes, the mixture divides into four separate layers, the upper one being clear and of a dark wine color, the next turbid and light brown, the third saponaceous and whitish-yellow, and the lower one being a clear yellowish-white liquid. By rubbing with diluted muriatic acid it forms a liquid which, on standing, throws down a yellowish-white precipitate, the supernatant liquor being clear and transparent; the same result ensues when rubbed with diluted sulphuric acid. Ammonia added to its aqueous solu tion forms a light straw-colored, saponaceous fluid, with a very small precipitate of a dark color. Rubbed with sulphuric acid it becomes of a dark brownish-red color, and partially dissolves; with nitric acid, it becomes light yellowish-red; with muriatic acid, whitish-yellow; with acetic acid a light straw color, and partially dissolves; ammonia or liquor potassa forms an amber color with it. Dioscorein should be kept in bottles well-stopped; if it is desired to form pills of it, exposure to the atmosphere will produce the proper tenacity for this purpose.

Properties and Uses.—Dioscorein possesses the properties of the crude root in an eminent degree, and is undoubtedly as much a specific in bilious colic, as quinia is in intermittent. In a severe case of bilious colic pronounced past hope by several physicians, four grains rubbed up with a tablespoonful of brandy afforded prompt relief, and a repetition of the dose, in about twenty minutes from the time of taking the first, effected a cure. In ordinary cases, one or two grains of Dioscorein may be administered every five, ten, or twenty minutes, according to the urgency of the case. In flatulence, borborygmi, etc., it may be advantageously combined with ginger, aletrin, or asclepidin; in many forms of uterine disease its union with cimicifugin, senecin, caulophyllin, etc., will prove very useful; and it may be combined with the extract of cornus sericea, to overcome the nausea and vomiting of pregnant females. In cramp of the stomach, or painful spasmodic affections of the bowels, a pill or powder composed of equal parts of Dioscorein, caulophyllin, and viburine, will be found a remedy of great value, as well as in after-pains; the mixture should be given in three or four grain doses, and repeated every half-hour or hour. It is strictly an American remedy, of great value, and not hitherto employed by practitioners of other countries. Dose of Dioscorein, from one to four grains, repeated as circumstances require.

DIOSPYROS VIRGINIANA.

Persimmon.

Nat. Ord.—Ebenaceæ. *Sex. Syst.*—Diœcia Octandria.

THE BARK AND UNRIPE FRUIT.

Description.—This is an indigenous tree growing from fifteen to fifty feet, or more in height, its dimensions being larger at the South; its bark is rough and dark-colored, and its branches alternate and spreading. The *leaves* are alternate, elliptic or ovate oblong, abruptly acuminate, from three to five inches long, entire, smooth, shining, glaucous beneath, the petiole, veins, and margin puberulent. The *flowers* are obscure, pale greenish-yellow, the fertile ones in axillary racemes, one to three-flowered, the pedicels shorter than the flowers; the sterile smaller and often clustered. *Stamens* sixteen in the sterile flowers, and eight in the fertile, in the latter imperfect; *anthers* of the sterile flowers, bilobed. *Style* two to four cleft, short; *stigma* obtuse, spreading. *Fruit* a round, golden, yellow berry, about an inch in diameter, containing a sweet and edible pulp, and from six to eight hard, compressed seeds.—*W.*—*G.*

History.—This is a well known indigenous tree, growing in woods and fields from Rhode Island to the Western States and southward, flowering from April to July, ripening its fruit in September and October, and which is edible after an exposure to frost. The unripe fruit is very astringent, as well as the bark, and are the officinal portions of the tree.

B. R. Smith found the unripe fruit to contain lignin, tannic acid, sugar, a little malic acid, and coloring matter; also, that when ripe the tannic acid almost disappears, while the sugar and malic acid become more abundant.—(*Am. Jour. Pharm.*, *XVIII.*, 167.) The bark probably contains tannic and gallic acids. Water, spirit, or alcohol extracts the virtues of the bark and unripe fruit.

Properties and Uses.—Tonic and astringent. The bark has been used in intermittents, and both it and the unripe fruit have been beneficial in various forms of disease of the bowels, chronic dysentery, and uterine hemorrhage; used in infusion, syrup, or vinous tincture, in the proportion of one ounce of the bruised fruit to two fluidounces of the vehicle, and half a fluidounce or more given to adults, and a fluidrachm or more to infants. The infusion may be used as a gargle in ulcerated sore-throat. When ripe the fruit is very palatable, and as it matures at a time when fruits are generally departing for the season, the cultivation of the tree would undoubtedly be a valuable accession to our autumnal fruits. A pleasant beer is made with the ripe fruit, hops, water, and yeast; and a species of brandy is obtained by distillation of the fermented infusion.

DIRCA PALUSTRIS.

Leatherwood.

Nat. Ord.—Thymelaceæ. *Sex. Syst.*—Octandria Monogynia.

THE BARK.

Description.—This is an indigenous shrub, known by the various names of *Moosewood*, *American Mezereon*, and *Wicopy*, and attains the height of five or six feet, having crooked, jointed, and spreading *branches*. The *leaves* are alternate, simple, entire, on very short petioles, oblong-ovate, or obovate, downy when young, smooth and membranous when fully grown, pale underneath. The *flowers* are axillary, yellow, and appear long before the leaves; when young they are inclosed within a small hairy bud-like involucre, occupying a sheath or cavity in the end of each flowering branch, usually in bunches of three together, with their peduncles cohering. *Corolla* none. *Calyx* funnel-shaped, half an inch long, with a contraction near the base and another in the middle. *Stamens* eight, much longer than the calyx, and alternately a long and a short one, with rounded anthers. *Ovary* ovate, placed obliquely, the style appearing to issue from one side; *style* filiform, curved, longer than the stamens, and terminated by an acute stigma. *Fruit*, a small, oval, red or orange-colored berry, containing one seed.—*B.*—*W.*

History.—This shrub is more common to the Northern and Eastern States, being occasionally met with in the West; it inhabits marshy places, low swampy woods, etc., flowering in April and May. The bark is the part used; it is very tenacious and fibrous, and hard to pulverize. It has a disagreeable odor, and a pungent taste with considerable acrimony, producing ptyalism, and which property it imparts to alcohol, and slightly to boiling water. It has been used for making ropes, thongs, and baskets, and might be advantageously employed in the arts, for making paper, etc. The wood is white, soft, and very brittle. It has not been satisfactorily analyzed, though mucilage, an acrid resin, and bitter extractive have been found in it.

Properties and Uses.—The bark is acrid, rubefacient, and vesicant when fresh. From five to seven grains of it causes great gastric heat and uneasiness, with emesis and catharsis. In contact with the skin it produces rubefaction, followed by blisters, and the sores it occasions are frequently difficult to heal, forming very indolent and obstinate ulcers. If chewed it causes salivation, with burning pain in the tongue, gums, etc., and has thus proved useful as an irritant in paralysis of the tongue, tooth-ache, facial neuralgia, etc. Bigelow says, that a decoction of the bark may be used as a sudorific and expectorant, in the place of senega. The berries produce vomiting, and are said to be a narcotic poison. The bark, or berries are rarely used in practice.

DORSTENIA CONTRAYERVA.

Contrayerva.

Nat. Ord.—Urticaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—This is a perennial, caulescent plant, with a spindle-shaped *root*, from which arises a *stem* covered with spreading, green, scaly stipules. The *leaves* are palmate; the lobes lanceolate, acuminate, coarsely serrated and gashed, occasionally almost pinnatifid. *Receptacle* on a very long stalk, quadrangular, wavy or plaited. *Achenia* lenticular, imbedded in the fleshy receptacle, from which they are projected with elasticity when ripe.—*L.*

History.—This plant inhabits the tropical parts of South America. The root, which is the part used, is knotty and ovoid, woody, an inch or two long, of a reddish-brown color externally, and pale within; its diameter is about half an inch, and long, rough, slender fibers shoot out from all sides of it, especially its lower portion, and are generally loaded with small, brown knots. It has a peculiar aromatic odor, and a somewhat astringent, warm, bitterish taste, with some acridity when long chewed. As the fibers have but little odor or flavor, they should be removed from the rhizome. It yields its virtues to alcohol, or water at 212° F.; the root abounds in mucilage; its tincture has an acid reaction on litmus. According to Geiger, the root contains volatile oil, starch, and bitter extractive, to which may be added resin, free acid, and woody fiber.—*P.* The root of the shops is probably derived from several other species, which possess similar virtues, as the *D. Braziliensis*, of Brazil, and which has been supposed to furnish the true root,—*D. Houstoni*, etc. Monardes states that the word *contrayerva* is the Indo-Spanish term for alexipharmic or counter-poison.

Properties and Uses.—Contrayerva is a gentle stimulant, and a diaphoretic, and is sometimes given in exanthematous diseases, typhus and dysentery. Its dose, in powder, is thirty grains; the best form of administration is the infusion. The Virginia snake-root is preferred to it in this country.

DRYMIS WINTERI. (*Wintera Aromatica.*)

Winter's Bark.

Nat. Ord.—Magnoliaceæ. *Sex. Syst.*—Polyandria Tetragynia.

THE BARK.

Description.—This is a very large, evergreen, aromatic tree, varying in size from six to fifty feet high. The bark of the trunk is gray and wrinkled, and that of the branches smooth and green. The *branches* are rather erect, and scarred by the traces of fallen leaves. The *leaves* are alternate, oblong, obtuse, with a midrib, but otherwise veinless, glabrous, and firmly dotted beneath. The *flowers* are small, on axillary or somewhat terminal peduncles, which are approximated, usually one-flowered, simple; occasionally divided a little above the base into long pedicels. *Sepals* two or three; *petals* six, oblong. *Fruits* four or six, obovate, baccate, many-seeded.—*L.*

History.—This tree inhabits the southern parts of South America, Chili, Peru, Terra del Fuego, etc., and takes its name from its discoverer, Capt. Winter. The bark of the tree is the part employed; it is in quills or rolled pieces a foot and more in length, from one to two inches in diameter, several lines in thickness, pale grayish-red externally, reddish-brown internally, with a few oval darker spots, free from transverse or longitudinal cracks, of an aromatic odor, and a warm, pungent taste. M. Henry found in it a reddish-brown, inodorous, acrid resin, a pale yellow volatile oil, tannic acid, oxide of iron, coloring matter, and various salts.

Properties and Uses.—Stimulant, aromatic, and tonic, and may be substituted in all cases for the Canella and Cinnamon barks. It was highly recommended by its discoverer as an antiscorbutic. Thirty grains is the dose of the powdered bark. It is seldom used in this country. Another tree inhabiting Chili, *Drymis Chilensis*, has a bark possessing analogous virtues.

EPIGÆA REPENS.

Trailing Arbutus.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This plant has several names, as *Winter-pink*, *Gravel-weed*, *Mountain-pink*, *Ground Laurel*, *May-flower*, etc. It is a small trailing plant, indigenous, with woody *stems* from six to twenty inches long, and is covered with a hairy pubescence in all its parts. The *leaves* are evergreen, alternate, cordate-ovate, entire, two or two and a half inches long, by one and a half wide, roundish at the end, and abruptly tipped with a very short point, and stand on slender petioles. The *flowers* are very fragrant, white or tinged with various shades of red, and are disposed in small axillary clusters on short stalks. The *corolla* is hypocrateriform, tube cylindrical, longer than the calyx, hairy within, limb five-parted, spreading. *Calyx* green, five-parted, with three large bracts at base; *stamens* ten, with filiform filaments; *anthers* oblong, awnless, dehiscent by two longitudinal openings. *Capsule* or *pod* depressed globular, five-lobed, five-celled, many-seeded.—*W.*—*G.*

History.—This shrubby little plant grows in sandy woods, sometimes in rocky soil in the shade of pines, and is found from Newfoundland to Pennsylvania and Kentucky. Its flowers exhale a rich, spicy fragrance, and appear in April and May. Cattle who chew this herb, are said to be seriously affected by it. The leaves are the officinal parts, and yield their properties to water or spirits. No analysis has been made of the plant.

Properties and Uses.—Diuretic and astringent. This is a very valuable American remedy, and is highly beneficial in lithic acid gravel, and all diseases of the urinary organs; it is superior to the uva ursi, or foreign buchu, and where these have failed in producing benefit, this has succeeded. It may be used as a substitute for the uva ursi. The fluid extract is an elegant preparation for all urinary difficulties. It enters into a very useful preparation, termed *Diuretic compound*, which see under the head of *Infusions.* It has been occasionally used with advantage in diarrhea, and bowel complaints of children. The infusion of the leaves may be drank freely.

Off. Prep.—Extractum Epigeæ Fluidum; Infusum Epigeæ.

EPILOBIUM ANGUSTIFOLIUM.

Willow Herb.

Nat. Ord.—Onagraceæ. *Sex. Syst.*—Octandria Monogynia.

THE LEAVES AND ROOT.

Description.—This plant, sometimes known as *Rose-bay*, is the Epilobium Spicatum of Lamark; it is a perennial, indigenous plant, with a simple, erect *stem* from four to six feet in height. The *leaves* are scattered, lanceolate, sessile, smooth, subentire, with a marginal pellucid vein, from two to five inches in length, and one-fourth as wide. The *flowers* are large, numerous, very showy, pink-purple, and in a long terminal spike or raceme. The *corolla* has four deep lilac-purple petals, clawed, and widely spreading. *Calyx-tube* not prolonged beyond the ovary; limb four-cleft, four-parted, and deciduous. *Stamens* eight, and as well as the *style*, turned to one side. *Stigma* with four linear, long, revolute lobes. *Ovary* and *capsule* long, linear, four-cornered, four-celled, four-valved; *seeds* numerous, with a tuft of long hairs.—*W.*—*G.*

History.—Willow Herb is found growing in the United States in newly cleared lands, and low waste grounds in the Northern States, flowering in July and August. The leaves and roots are the parts used, and yield their virtues to water or spirits.

Properties and Uses.—Tonic, astringent, demulcent, and emollient. An infusion of the leaves will be found beneficial in chronic diarrhea, dysentery, leucorrhea, menorrhagia, and uterine hemorrhage; and forms an excellent local application for ophthalmia, ulcerations of the mouth and throat, and leucorrhea. The leaves in poultice are a valuable remedy for foul and indolent ulcers. Dose of the infusion, from two to four fluidounces, three or four times a day.

EQUISETUM HYEMALE.

Scouring Rush.

Nat Ord.—Equisetaceæ. *Sex. Syst.*—Cryptogamia Filices.

THE PLANT.

Description.—This plant, also known by the names of *Horse Tail*, *Shave Grass*, etc., is a perennial plant, with simple, stout, erect, jointed and hollow *stems*, fourteen to twenty-six longitudinal furrows, the ridges rough with two rows of minute tubercles, and growing from two to three feet in height, each stem bearing a terminal, ovoid spike; frequently two or more stems are united at the base from the same root. The *sheaths* are from two to three lines long, and from an inch to an inch and a half apart, ashy-white, black at the base and summit, short, with subulate, black, awned, and deciduous teeth, which leave a bluntly crenate margin. *Fertile* plants mostly leafless. *Fruit* placed under peltate polygons, being pileus-like bodies, which are arranged in whorls, forming a spike-like raceme; from four to seven spiral filaments surround the spores, which resemble green globules, and which roll up closely around them when moist, and uncoil when dry.—*G.*—*W.*

History.—This plant is common to the northern and western parts of the United States, growing in wet grounds, on river banks, and borders of woods, and maturing in June and July. They, together with other Cryptogamia abound in the fossil remains of coal measures, indicating that they were once of gigantic dimensions, and formed a large part of the original flora of our globe. The *E. Lævigatum* and *E. Robustum*, of the southern and western borders of our country, may be substituted for the above. Silex enters largely into the composition of these plants, on which account they have been used to scour, rough polish, etc. The whole plant is medicinal, and imparts its properties to water.

Properties and Uses.—Diuretic and astringent. An infusion drank freely has been found beneficial in dropsy, suppression of urine, hematuria, gravel, and nephritic affections; and has also been used with advantage in gonorrhea and gleet. The ashes of the plant are very valuable in dyspepsia connected with obstinate acidity of stomach, and may be given alone, or combined with powdered resin, or hydrastin, etc. Dose of the pulverized ashes from three to ten grains, to be repeated three or four times daily.

ERECHTHITES HIERACIFOLIUS.

Fireweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT AND HERB.

Description.—This plant is the *Senecio Hieracifolius* of Linnæus; it has an annual, herbaceous, grooved, thick, fleshy, branching, virgate, panicled, and roughish *stem*, from one to five or even eight feet high. The *leaves* are simple, alternate, large, lanceolate or oblong, acute, unequally and deeply toothed with acute indentures, sessile, and light-green; the upper ones often with an auricled clasping base. The *flowers* are whitish, terminal, crowded, and destitute of rays. *Involucre* smooth, large, tumid and bristly at the base. *Achenia* oblong, hairy.—*W.*—*G.*

History.—This is an indigenous, rank weed, growing in fields throughout the United States, in moist woods, and in recent clearings, especially and abundantly in such as have been burned over. It flowers from July to October, and somewhat resembles in appearance the Sowthistle, *Sonchus Oleràceus;* the flowers somewhat resemble those of lettuce. The whole plant is officinal, and yields its virtues to water or alcohol. It has a peculiar, aromatic and somewhat fetid odor, very unpleasant to many persons, and a peculiar, slightly pungent, bitterish, rather disagreeable taste, with some astringency. These properties appear to depend upon a volatile oil, which may be obtained from the plant by distillation with water, and which possesses in an eminent degree the taste and odor of the plant, and which is very persistent; it is of a light-yellowish color.

Properties and Uses.—Fireweed is reputed to be emetic, cathartic, tonic, astringent and alterative, of which the most valuable are the latter three. Reputed an unrivaled medicine in diseases of the mucous tissues of the lungs, stomach, and bowels. A spirituous extract of the plant has been highly recommended by Dr. A. R. Wyeth, of Pennsylvania, in the treatment of cholera and dysentery, in the latter disease promptly arresting the muco-sanguineous discharges, relieving pain, and effecting a speedy cure. In the summer-complaint of children, he has found it to prove almost invariably successful, even in cases where other means had failed.

Off. Prep.—Infusum Erechthites; Oleum Erechthites.

ERIGERON CANADENSE.

Canada Fleabane.

Nat. Ord.—Asteraceæ, or Compositæ Asteroideæ. (*De Candolle.*) *Sex. Syst.*—Syngenesia Superflua.

THE WHOLE PLANT.

Description.—This plant is known by the various names of *Colt's-tail*, *Pride-weed*, *Scabious*, *Horse-weed*, *Butter-weed*, etc. It is an indigenous annual herb, with a high, branching, furrowed, and bristly-hairy *stem*, from six inches to nine feet in height. The *leaves* are linear-lanceolate, ciliate; lower ones subserrate. The *flowers* are very small, numerous, white, irregularly racemose upon the branches, and constituting a large, terminal, oblong panicle. *Involucre* cylindric; *rays* minute, numerous, crowded, short; *pappus* simple.—*W.*—*G.*

History.—This plant is common to the northern and central portion of the United States, growing in fields and meadows, by roadsides, and in waste places, and flowering from June to September. The very small, inconspicuous ray-flowers, which are multitudinous, the elongated involucre, and the simple pappus, will serve to distinguish it from other plants of the same family. The whole herb is officinal, and should be gathered when in bloom, and carefully dried. It has a feeble but pleasant odor, and a subastringent and amarous taste, with some acrimony, and yields its properties to alcohol, or water by infusion. Its acridity is lessened by boiling, owing to the dissipation of its essential oil. Dr. De Puy, who made an examination of the plant, found it to contain essential oil, tannic and gallic acids, bitter extractive, etc. The oil is not astringent to the taste, but has a styptic influence upon the system. It is of a colorless, or pale-yellow color, gradually becoming darker colored, and may be procured from the plant. by distillation with water.

Properties and Uses.—This plant is slightly tonic, with more active diuretic and astringent properties. The infusion has been found efficient in diarrhea, gravel, diabetes, dropsical affections, dysury of children, painful micturition, and in many nephritic affections. It may be given in the form of powder in doses of half a drachm, or a drachm; or the infusion, which is the best form of administration, may be given in doses of from two to four fluidounces, three or four times a day; the aqueous extract is worthless, but the fluid extract may be given in teaspoonful doses.

The volatile oil of E. Canadense acts as an astringent, and may be used as a local application to hemorrhoids, bleeding from small wounds, etc., likewise in rheumatism, boils, tumors, and sore-throat, in which it should be combined with goose-oil or some similar substance, being too acrid to use alone. Internally, it will be found useful in diarrhea, dysentery, hemoptysis, hematemesis, and hematuria; from four to six drops of it on sugar, or dissolved in alcohol, and given in a little water, will be found a powerful remedy in uterine hemorrhage and menorrhagia, acting promptly and efficaciously; it may be repeated every five or ten minutes if required.

Off. Prep.—Infusum Erigeroni; Oleum Erigeroni.

ERIGERON HETEROPHYLLUM.

Various-leaved Fleabane.

ERIGERON PHILADELPHICUM.

Philadelphia Fleabane.

Nat. Ord.—Asteraceæ, or Compositæ-Asteroideæ. (*De Candolle.*) *Sex. Syst.*—Syngenesia Superflua.

THE WHOLE PLANT.

Description.—The Erigeron Heterophyllum is the *E. Annuum* of Persoon, and many other celebrated botanists, and which name will probably be hereafter generally adopted. It is a biennial herb, with a branching root. The *stems* are from two to four feet high, thick, branching, hispid with scattered hairs, and terminating in a large, diffuse, corymbose panicle of large heads. The *leaves* are hirsute, coarsely serrate; the lowest ovate, contracted at base into a winged petiole; *stem* leaves ovate-lanceolate, sessile, acute, entire at both ends, the highest lanceolate. The *flowers* are numerous; *disk-florets* yellow; *ray-florets* capillary, white or purplish. *Pappus* plainly double, the outer a crown of minute chaffy-bristle-form scales; the inner of scanty capillary bristles which are deciduous, or entirely wanting in the ray. This plant is common to the United States and Europe, being a very common weed in fields and waste grounds from Canada to Pennsylvania and Kentucky, and flowering from June to August.—*W.*—*G.*

The *Erigeron Philadelphicum* is the *E. Strigosum* of Willdenow, and the *E. Purpureum* of Aiton. It is a perennial herb, with a slender, pubescent or hirsute, leafy *stem*, one to three feet high, loosely corymbed at the summit, bearing a few small heads on long, slender peduncles; the *root* is yellowish and branching. The *leaves* are from two to four inches by from six to nine, thin, with a broad midrib, oblong; the lower ones spathulate, crenate-dentate; the upper ones oblong-lanceolate, clasping by a heart-shaped base, subserrate. The *flowers* are numerous; *disk-florets* yellow; *ray-florets* innumerable, very narrow, rose-purple or flesh-color, twice as long as the hemispherical involucre. *Pappus* simple. The whole herb is pubescent. This plant is found growing in common with the preceding variety, flowering at the same period.—*W.*—*G.*

History.—The medicinal virtues of these plants are analogous, and they may be safely substituted the one for the other; they are, however, less astringent and more diuretic than the E. Canadense. The plant should be gathered during the months of July, August, and September, or during their flowering season. They are slightly fragrant, have a subastringent, somewhat bitter taste, and yield their virtues to alcohol, or to water by infusion. Mr. F. L. John obtained from seventeen pounds of the dried herb but a drachm of greenish-yellow, powerful, aromatic oil, with a disagreeable, bitter, pungent taste, and sp. gr. 0.946.—*Am. Jour. Pharm.*, *XXVII.*, 105.

Properties and Uses.—Diuretic, astringent and tonic. The infusion is very efficacious in affections of the bladder and kidneys, dysury, especially of children, painful micturition, various forms of dropsy, gravel, and in hydrothorax connected with gout. It has also been recommended as a diaphoretic in rheumatism, fevers, colds, etc., and as an emmenagogue in suppressed menstruation ; and has been used with advantage in gout, some forms of cutaneous eruptions, and diabetes. Dose of the infusion, from two to four fluidounces, three or four times a day.

ERYNGIUM AQUATICUM.

Water Eryngo.

Nat. Ord.—Apiaceæ, or Umbelliferæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant, also called *Button Snakeroot*, *Rattlesnake's Master*, etc., is an indigenous perennial herb, with a simple *stem*, from one to five feet in height; the *root* is tuberous ; the *leaves* are one or two feet long, by half an inch to an inch and a half wide, broadly-linear, parallel veined, taper-pointed, grass-like, ciliate, with remote soft spines. *Bracts* tipped with spines, those of the involucels entire, shorter than the heads. The *flowers* are white or pale, inconspicuous, and disposed in ovate-globose heads, which are pedunculate, and from half an inch to an inch in diameter. *Calyx* five-parted, permanent ; *styles* slender ; *petals* connivent, oblong, emarginate, with a long inflexed point. *Fruit* scaly, top-shaped, bipartile. —W.—*G.*

History.—This plant is a native of the United States, growing in swamps and low wet lands, from Virginia to Texas, and especially on the prairie lands. It flowers in August. The root is the officinal part. It has a dark-brown, very knotty rhizoma, wrinkled horizontally, with many fibers of the same color, growing downward, furrowed or wrinkled longitudinally, and from a line to a line and a half in thickness. Internally it is yellowish-white, of a peculiar smell, somewhat resembling that of *Iris Versicolor*, and a faintly-sweetish, mucilaginous, aromatic taste, succeeded by bitterness, some degree of pungency affecting the fauces, and a very slight astringency. It is easily pulverizable. Water or spirit extracts its properties. It has not been analyzed but is worthy attention.

Properties and Uses.—Diuretic, stimulant, diaphoretic, expectorant, and, in large doses, emetic. Very useful in dropsy, nephritic and calculous affections, also in scrofula and syphilis; as a diaphoretic and expectorant in pulmonary diseases. Recommended as a substitute for Senega. The pulverized root in doses of two or three grains has proved very effectual in hemorrhoids and prolapsus ani. Two ounces of the pulverized root, added to one pint of good Holland gin, has effected cures in obstinate cases of gonorrhea and gleet; to be administered in doses of one or two fluidrachms three or four times a day; by some practitioners this root is employed as a specific in gonorrhea, gleet, and leucorrhea; used internally in syrup, decoction, or tincture, and the decoction applied locally by injection. Used externally and internally, it is said to cure the bites of snakes and insects. Dose of the powder, from twenty to forty grains; of the decoction, which is principally used, from two to four fluidounces, several times daily.

Off. Prep.—Decoctum Eryngii.

ERYTHRONIUM AMERICANUM.

Adder's Tongue.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE LEAVES AND ROOT.

Description.—This plant, also known by the name of *Dog's Tooth Violet*, *Yellow Snowdrop*, *Rattlesnake Violet*, *Yellow Erythronium*, etc., is an indigenous, perennial herb, with a *cormus* or *bulb* at some distance below the surface, which is white internally, and fawn-colored externally. The *scape* is naked, slender, three or four inches high. The *leaves* are two, subradical, lanceolate and involute at the point, pale-green with purplish or brownish spots, about five inches long, and one of them nearly twice as wide as the other. The *flower* is single, drooping, yellow, liliaceous, spotted near the base, expanded and revolute in the sunshine, closing somewhat at night and on cloudy days. *Segments of the perianth* oblong-lanceolate, obtuse, inner ones bidentate near the base. *Stamens* six; *filaments* flat; *anthers* oblong-linear. *Ovary* obovate; *style* club-shaped, longer than the stamens, three-lobed at top, and terminating in three undivided stigmas. *Capsule* oblong-obovate, stipitate, three-valved; *seeds* rather numerous, ovoid, with a loose membranaceous tip.—*W.*—*G.*

History.—This is a beautiful little plant, among the earliest of our vernal flowers, found in rich, open grounds, or in thin woods, throughout the United States; it flowers in April or May. The bulb and leaves are the parts used, and impart their virtues to water. The leaves are said to be more active than the root.

Properties and Uses.—Emetic, emollient, and antiscrofulous when fresh;

nutritive when dried. The fresh roots and leaves, simmered in milk, or the fresh leaves, bruised and applied as a poultice to scrofulous ulcers or tumors, together with a free internal use of an infusion of them, is highly recommended as a remedy for scrofula. The expressed juice of the plant, infused in cider, is reputed useful in dropsy, and for relieving hiccough, vomiting and hematemesis. Twenty-five grains of the fresh root, or forty of the recently-dried root, will operate as an emetic, though this result is sometimes uncertain.

EUONYMUS ATROPURPUREUS.

Wahoo.

Nat. Ord.—Celastraceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This is a small shrub or bush, known by several other names, as *Indian Arrow-wood*, *Burning-bush*, *Spindle-tree*, etc., with smooth *branches*, and rising from five to ten feet in height. The *leaves* are from two to five inches in length, and about half as wide, opposite, on petioles from one-third of an inch to an inch in length, elliptic-lanceolate, mostly acute at base, finely serrate, pubescent beneath; *peduncles* opposite, slender, compressed, from an inch to two and a half inches in length, and each with a cyme of from three to six flowers. *Flowers* dark-purple, usually pentamerous; *corolla* about two and a half lines in diameter, flat, and inserted on the outer margin of a glandular disk; *calyx* flat, of four, five, or six united sepals; *stamens* five, with short filaments; *capsule* or *pod* smooth, crimson, five-angled, five-celled, five-valved; *seeds* one or two in each cell, inclosed in a red aril.—*W.*—*G.*

Euonymus Americanus is of a smaller size than the preceding variety, with smooth, four-angled *branches;* the *leaves* are oval and elliptic-lanceolate, sessile, subentire at the margin, acute or obtuse at apex, smooth, coriaceous, from one-third of an inch to two inches in length, and about one-third as wide. The *peduncles* are round, longer than the leaves, and with two, three, or four flowers. *Flowers* somewhat larger than those of the preceding variety, yellow and pink; *capsule* dark-red, rough-warty, depressed, not so copious as in the former plant.—*W.*—*G.*

History.—There are two varieties of this plant used in medicine—the Spindle-tree, *E. Atropurpureus*, and the Burning-bush, or *E. Americanus*, to both of which the term *Wahoo* is indiscriminately applied. They grow in many sections of the United States, in woods and thickets, and in river bottoms, and flower in June. The bark of the root is the officinal part. It has a bitter, and somewhat unpleasant taste. Water or alcohol extract its virtues. The decoction, concentrated by evaporation, yields acicular crystals, the exact nature of which are not yet ascertained; probably an alkaloid. They are soluble in boiling water, but are deposited on cooling; soluble in oils, partly soluble in nitric acid, but insoluble in cold water, sulphuric acid and alcohol. If these should prove to be the alkaloid principle of the plant, they will be termed *Euonymia.* A Pharmaceutical Institute of New York advertise a preparation which they call Euonymine, and state to be the active principle of *E. Americanus.* It is held to be an alterative, tonic, laxative, and expectorant. Unfortunately, we have not been made acquainted with the article, nor its method of preparation.

Properties and Uses.—These plants have been in use among physicians for a long time. The bark is tonic, laxative, alterative, diuretic, and expectorant; in infusion, syrup, or extract, it has been successfully used in intermittents, dyspepsia, torpid liver, constipation, dropsy, and pulmonary affections. Dose of the saturated tincture, from one to four fluidrachms; of the syrup, from one to two fluidounces; of the hydro-alcoholic extract, from five to fifteen grains; of the powder, from twenty to thirty grains. The seeds are cathartic and emetic.

EUPATORIUM AROMATICUM.

White Snakeroot.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Sygenesia Æqualis.

THE ROOT.

Description.—This is a perennial plant, with a rough, slightly pubescent *stem*, about two feet in height, and corymbose at the summit. The *leaves* are from two to four inches long, and about one-half as wide, on petioles not quite an inch long, opposite, subcordate, lance-ovate, acute, three-veined, obtusely serrate, smoothish, or very slightly pubescent. *Involucre* simple, pubescent; *scales of the involucre* nearly equal, and in one row; *flowers* white, aromatic, in small corymbs; *heads* large, ten to fifteen flowered.—*W.*

History.—This is an indigenous plant, growing from Massachusetts to Louisiana, but especially throughout the Middle States, and flowering in August and September. The root is the officinal part, and should be collected in September and October. It has a pleasant, aromatic odor, and bitterish taste. Its virtues are extracted by boiling water.

Properties and Uses.—Diaphoretic, antispasmodic, expectorant and aromatic. Used in the form of infusion or decoction in fevers of a typhoid character, connected with wakefulness; also in pleurisy and peripneumony, as a diaphoretic and expectorant. In hysteria, hypochondria, nervous irritability and flatulence, it is very beneficial. Dose of the infusion or decoction, from half a fluidounce to four fluidounces. It is sometimes connected with sanguinaria and asclepias, in pulmonary diseases. Said to be valuable in gravel.

Off. Prep.—Infusum Eupatoriæ Aromaticæ.

EUPATORIUM PERFOLIATUM.

Boneset.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Sygenesia Æqualis.

THE TOPS AND LEAVES.

Description.—Boneset, or *Thoroughwort*, as it is also called, is an indigenous perennial herb, with a horizontal, crooked root. The *stems* are round, stout, rough, hairy, and from one to five feet high. The *leaves* are opposite, connate-perfoliate, each pair resembling a single leaf centrally perforated by the stem, and placed at right angles to it; they are rough, rugose, serrate, tapering to a long point, very veiny, downy beneath, and both combined are from eight to fourteen inches in length. The *flowers* are numerous, white, in dense, fastigiate, terminal corymbs; *heads* about twelve-flowered; *scales* of the cylindrical, imbricated *involucre* linear-lanceolate; *florets* tubular, with five-spreading segments, and a rough, down-like pappus; *anthers* blue or black, included. *Style* filiform, divided into two filiform, acuminate branches, which project beyond the corolla; *fruit* or *seeds* oblong, black, prismatic, acute at base, on a naked receptacle.—*W.*—*G.*—*L.*

History.—This is a well known plant, growing in low grounds and on the borders of swamps, streams, etc., throughout the United States, flowering in August and September. The tops and leaves are the parts used. It has a feeble, peculiar odor, and a herbaceous, very bitter taste. Alcohol or boiling water extracts its medicinal properties. According to Mr. W. Peterson, it contains a resin soluble in alkalies, a peculiar bitter substance analogous to resin but slightly soluble in water, a crystalline matter, chlorophylle, gum, tannic acid, yellow coloring matter, extractive, salts of potassa, and lignin.—*Am. Jour. Pharm.*, *XXIII.*, 210.

Properties and Uses.—This is a very valuable medicinal agent. The cold infusion, or extract, is tonic and aperient; the warm infusion, diaphoretic and emetic. As a tonic, it is useful in remittent, intermittent and typhoid fevers, dyspepsia and general debility; and combined with bitartrate of potassa and camphor, the powdered leaves have been serviceable in some forms of cutaneous disease. In intermittent fever a strong infusion, as hot as can be comfortably swallowed, is administered, for the purpose of vomiting freely. This is also attended with profuse diaphoresis, and sooner or later by an evacuation of the bowels. During the intermission, the cold infusion, or extract is given every hour as a tonic and antiperiodic. In epidemic influenza the warm infusion is valuable as an emetic and diaphoretic, likewise in febrile diseases, catarrh, colds, and wherever such effects are indicated. The warm infusion is also administered to promote the operation of other emetics. Externally, used alone or in combination with hops or tansy, etc., a fomentation of the leaves applied to the bowels have been useful in inflammation, spasms, and painful affections. Dose of the powder, from ten to twenty grains; of the extract, from two to four grains; of the infusion, from two to four fluidounces.

Off. Prep.—Extractum Eupatorii; Infusum Eupatorii; Pilulæ Aloës Compositæ.

EUPATORIUM PURPUREUM.

Queen of the Meadow.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant, likewise known by the names of *Gravel-root*, *Joe-pye*, *Trumpet-weed*, is herbaceous, with a perennial, horizontal, woody caudex, with many long, dark-brown fibers, which send up one or more solid, glabrous, green, sometimes purplish stems, five or six feet in height, with a purple band at the joints, about an inch broad: The *leaves* are from three to six in a whorl about six inches apart, oblong-ovate, or lanceolate, pointed, rugosely or feather veined, coarsely serrate, slightly scabrous, with a soft pubescence beneath along the midvein and veinlets, thin, soft, on petioles an inch long, and from eight to twelve inches long by three or four inches wide. The *flowers* are all tubular, purple, varying to whitish, and consist of numerous florets included in an eight-leaved calyx. *Heads* in lax, very dense and compound corymbs, cylindrical, and from five to ten-flowered.—*W.*—*G.*

History.—Queen of the Meadow grows in low places, dry woods or meadows, in the Northern, Western, and Middle States, flowering in August and September. The root is the officinal part; as found in the shops, it consists of a blackish woody caudex, from which proceed numerous long fibers, from one to three lines in diameter; externally they are covered with a dark-brown, longitudinally-furrowed cortex, beneath which the internal portion is white, or whitish-yellow, according to its age, the last color being the oldest. It has a smell somewhat resembling old hay, and a slightly bitter, aromatic, and faintly astringent, but not unpleasant taste, and yields its properties to water by decoction, or spirits. It has not been analyzed; a principle has been obtained from it, by Mr. J. B. Robinson, of Cincinnati, to which he has given the name of *Eupatorine*. It is obtained by making a saturated tincture of the root, and adding to it an equal bulk of water slightly acidulated with muriatic acid; on distilling off the alcohol the resin is precipitated. It is a dark-brown resin, forming a yellowish-brown powder, with a peculiar, slightly-aromatic, not unpleasant odor, and a peculiar, slightly-bitterish taste. It is easily pulverized, but in a short time the powder forms a solid mass, of a dark-brown color, or if much exposed to the atmosphere, black, resembling asphaltum. Water alone, or acidulated with muriatic or sulphuric acids, does not dissolve it; but ammonia or liquor potassa added to water, dissolves it, the last forming a solution of a deep-red color, which on the addition of a few drops of muriatic acid, gives a clear, transparent liquor, with a light-yellow spongy substance floating on the surface, and which is, probably, the resin purified. It is partly soluble in alcohol, but becomes completely so on the addition of muriatic acid, to which if water be added, a grayish milky opaque liquid is formed, which on standing, or by evaporation of the alcohol, gives a light-brown precipitate. Ether dissolves it, and if ammonia be added, a separation ensues, the ether floating above with a yellow tinge, while the ammonia sinks, forming a clear dark-red solution; if liquor potassa be added to the ethereal solution, it causes a light yellowish-red liquor above, and a dark one below. Chloroform partially dissolves it, and wholly so on the addition of ammonia, which separates the solution into a yellow fluid below, and a dark-brown liquid above. It is insoluble in oil of turpentine. The therapeutical properties of this resin are not yet understood; it remains to be determined whether or no it possesses the virtues of the root.

Properties and Uses.—A valuable diuretic, stimulant, somewhat astringent, and tonic. Used with excellent effect in dropsical affections, strangury, gravel, and all chronic urinary disorders, hematuria, gout and rheumatism. Dose of the decoction of Queen of Meadow, from two to four fluidounces, three or four times a day.

Since writing the above, Mr. William S. Merrell has prepared an oleoresin from this plant, to which he has given the name of *Eupurpurin;* it may be obtained by adding the alcoholic tincture of the root, to twice its volume of water, and distilling off the alcohol, similar to the process for obtaining podophyllin, iridin, etc. It is of a thick, pilular consistence and a dark greenish-brown color, having a faint peculiar smell, and a slightly nauseous taste. It is soluble in alcohol or ether, and more speedily when these are hot; slowly soluble in oil of turpentine, from which ether precipitates the resin, holding the oily portion in solution, and on the addition of alcohol the resin is re-dissolved. It is almost completely soluble in dilute alkalies, but completely so, on the addition of a small quantity of ether. Eupurpurin, in doses of three grains, repeated every three or four hours, is a most powerful diuretic, occasioning in some instances a most enormous flow of urine. It may be given in pill form, either alone or combined with an equal quantity of castile soap. An excellent pill for many renal affections may be made, composed of Eupurpurin thirty grains, geraniin twenty grains, and extract of nux vomica one grain. Divide into ten pills. One of these pills may be given every four hours daily.

Off. Prep.—Decoctum Eupatorii Purpurei; Infusum Epigeæ Compositum.

EUPATORIUM TEUCRIFOLIUM. (*E. Verbenæfolium.*)

Wild Horehound.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE HERB.

Description.—This is an indigenous, perennial plant, with a herbaceous, paniculate, pubescent *stem*, growing from two to three feet high, with fastigiate, corymbose branches above. The *leaves* are opposite, sessile, distinct ovate-oblong, and ovate-lanceolate, rough, veiny, the lower ones coarsely serrate toward the base, the upper ones alternate, subserrate, and often entire. *Branches of the corymb*, few, unequal. The *flowers* are small, white, consist of five florets within each calyx; *scales of the involucre* oblong-lanceolate, rather obtuse, at length shorter than the flowers.—*W.—G.*

History.—This plant grows in moist places from Canada to Florida, flowering in September and October; the whole plant is medicinal, possessing properties analogous to boneset, but not so unpleasantly bitter. Its active properties are taken up by spirits, or water by infusion. It has not been analyzed.

Properties and Uses.—Tonic, diaphoretic, diuretic, and laxative. Recommended by Dr. Jones, of Georgia, in intermittent and remittent fevers. Usually administered in infusion; one ounce of the dried leaves infused in a quart of water, of which half a teacupful may be given every hour or two, as warm as can be comfortably drank; it will prove diaphoretic or diuretic, according to the temperature in which the patient is kept, and likewise laxative. The cold infusion, or tincture, is tonic.

The *Eupatorium Hyssopifolium*, and *Eupatorium Leucolepsis*, both called "Justice's Weed," have been used with success for curing the bites of snakes and other poisonous animals; they were employed for this purpose by John Justice, of South Carolina, in 1800, who received a premium for disclosing his remedy.

EUPHORBIA COROLLATA.

Large Flowering Spurge.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Dodecandria Trigynia, *Linnæus;* Monœcia Monadelphia, *Michaux.*

THE BARK OF THE ROOT.

Description.—This plant has many common names, as *Blooming Spurge*, *Milk-weed*, *Bowman's Root*, etc. It is a perennial plant, with a round, slender, erect *stem*, one or two feet high, generally simple and smooth; the *root* is yellowish, large and branching. The *leaves* are scattered, sessile, oblong-obovate, or linear, entire, flat or revolute at the margin, smooth in some plants, very hairy in others, verticillate and opposite in the umbel, and from one to two inches in length. *Flowers* in large, terminal umbels; *corolla-like involucre* large, white, showy. *Umbels* five-rayed, supported by as many bracteal leaves; not unfrequently a small axillary branch or two arise from the sides of the stem below the umbel. *Rays of the umbel* repeatedly trifid or dichotomous, each fork being attended by two leaflets and a flower. *Involucre* large, rotate, white, with five obtuse petal-like segments; at the base of these divisions are five interior, very small, obtuse segments. *Stamens* twelve; a great portion of the plants are wholly staminiferous. The *fruit* is a smooth three-lobed, three-celled capsule; *cells* one-seeded; *seeds* smooth.—*L.*—*W.*

History.—This is an indigenous plant, found growing in Canada and the United States, in dry fields and woods, and flowering from June to September. Upon breaking any part of the plant, a milky juice exudes, which is very irritating, causing pustulation, and even vesication when held in contact with the skin for some minutes. The root is from one-third of an inch to one or two inches in diameter, a foot or two in length, odorless, and nearly tasteless, producing a pungency in the mouth and fauces after having been chewed for some time; it should be gathered in the fall. The bark of the root is the officinal part, it is from a quarter of an inch to an inch and a half in thickness, constituting the major part of the root, and imparts its properties to alcohol, or water. It forms a light brownish-yellow powder, speckled throughout with innumerable fine dark spots, somewhat resembling a mixture of fine pepper and salt, with the exception of color. Dr. Zollickoffer found it to contain resin, mucilage, and caoutchouc. Kino and Catechu are *incompatible* with this plant; when united with either, the medicinal powers of the Euphorbia are destroyed, while the astringency of the Kino or Catechu becomes entirely altered. Probably all vegetable astringents are incompatible with the agent under consideration. Opium interferes with its emetic operation, and should not, therefore, be given in combination with it, when emesis is desired. Acetic acid also interrupts its emetic influence, causing it to pass off by the bowels.

Properties and Uses.—Emetic, diaphoretic, expectorant, and epispastic. Fifteen or twenty grains of the powdered bark of the root will excite emesis, rarely occasioning pain or spasms, and giving rise to very little previous nausea or giddiness; when it does not prove emetic, it passes off by the bowels. Four grains of the powdered root-bark, given every three hours, will act as a diaphoretic; or the compound powder of ipecacuanha and opium may be employed for the same purpose, substituting the E. corollata for the ipecacuanha. In doses of three grains, exhibited occasionally in a little honey, syrup or molasses, it operates as a useful expectorant, and may be administered in all cases where such action is desired. When given in large doses, it is apt to induce inflammation of the mucous coat of the stomach and bowels, with hypercatharsis. Occasionally, when given as an emetic or cathartic, it causes distressing nausea, with considerable prostration. From four to ten or twelve grains generally act as a cathartic. In dropsical diseases, especially hydrothorax and ascites, it will evacuate the water when all other agents prove useless; for which purpose it may be given in doses of fifteen or thirty grains, and repeated twice or three times weekly.

EUPHORBIA HYPERICIFOLIA.

Large Spotted Spurge.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Dodecandria Trigynia, *Linnæus;* Monœcia Monadelphia, *Michaux.*

THE LEAVES.

Description.—This plant, also known by the names of *Black-pursely*, *Milk-pursely*, *Eye-bright*, etc., is an annual plant, with a smooth, somewhat procumbent, branching *stem*, from one to two feet high; the *branches* are dichotomous, and divaricate-spreading. The *leaves* are from half an inch to an inch in length, and about one-fourth as wide, opposite, oblong, somewhat falciform, serrated, oblique or heart-shaped at base, often curved, three to five ribbed underneath, on very short petioles, and often marked with purple oblong dots and blotches. The *flowers* are small, white, numerous, and disposed in terminal and axillary corymbs. *Fruit* mostly rather hairy; *seeds* four-angled, obscurely wrinkled transversely.—*W.*—*G.*

History.—E. Hypericifolia is an indigenous plant, growing in rich soil in waste and cultivated places, and flowering from July to September. The leaves are the parts used, and yield their properties to water or alcohol; they have a sweetish taste, succeeded by a sensation of harshness and roughness. They contain caoutchouc, resin, tannin, gallic acid, etc.

Properties and Uses—Astringent, tonic, and slightly narcotic. As an astringent it has been found efficacious in dysentery, after having previously removed the inflammatory symptoms, often curing the disease in forty-eight hours; also in diarrhea, after the exhibition of some purgative; in menorrhagia from debility; also in leucorrhea, and other affections where this class of agents is indicated. Half an ounce of the dried leaves may be infused in a pint of boiling water for half an hour. In dysentery and diarrhea, a tablespoonful may be given every hour until the discharges become less frequent, and other morbid symptoms begin to yield; then to be used less frequently. In the other diseases a wineglassful may be given three times a day.

The *Euphorbia Maculata*, or Spotted Spurge, is possessed of similar properties, and has been used with advantage in the same forms of disease, as cholera-morbus, diarrhea, dysentery, etc. It is an annual plant, generally found growing with the *E. Hypericifolia*, and possesses sensible properties analogous to those of this variety. It has a procumbent *stem*, spreading flat on the ground, much branched and hairy; the *leaves* are opposite, oval or oblong, minutely serrulate toward the end, unequal at the base, slightly three-ribbed, smooth above, hairy and pale beneath, oblique at the base, on short petioles, often spotted with dark purple, from three to six lines long, and one-half as wide. The *flowers* are white, solitary, axillary, much shorter than the leaves, appearing from July to October; female flowers naked. *Filaments* articulated: *receptacle* squamose; *capsule* three-grained, smooth, pubescent, or warty; *seeds* four-angled, obscurely wrinkled transversely, and about one-third smaller than the E. Hypericifolia.— *W.—G.*

EUPHORBIA IPECACUANHA.

American Ipecacuanha.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Dodecandria Trigynia, *Linnæus;* Monœcia Monadelphia, *Michaux.*

THE BARK OF THE ROOT.

Description.—This plant, also known by the names of *Wild Ipecac' Ipecac Spurge*, *Spurge*, is a perennial plant, with a yellowish, irregular fleshy *root*, very large in proportion to the plant it bears, running deep into the sand, sometimes extending to the depth of six feet. The *stems* from one root are numerous, suberect or procumbent, smooth, thick, succulent, regular dichotomous, jointed at the forks, forming large branches on the surface of the ground; they are from three to eight inches long. The *leaves* are inserted at the joints, opposite, one or two inches long, by a fourth or half an inch wide, sessile, smooth, varying from oblong and circular to linear, and from green to purplish. The *flowers* are solitary, on long peduncles from the forks of the stem, small. The *calyx* is spreading, with five exterior obtuse segments, with five small, gibbous, inner segments or nectaries. *Stamens* numerous, in five parcels, appearing at different times two or three together, with double anthers. The fertile flowers have a large, roundish, drooping, pediceled germ, crowned with six revolute stigmas. The capsule is three-celled, containing three white, areolate-pitted seeds.—*L.*— *W.*— *G.*

History.—This is an indigenous plant, found growing in dry, sandy soil, on Long Island, in New Jersey, and the Middle and Southern States, and flowering from May to August. As with the E. Corollata, it yields a milky juice, which causes a pustular eruption when applied to the skin. The root is the part used in medicine. The fresh root is from three to seven feet long, tuberculated, and of a yellowish color; from half an inch to an inch in diameter, and of a very acrid taste. The dry root is light and brittle, without odor, and has a sweetish, not very disagreeable taste.—*E. & V.* The powdered root is of a light-brown, or light snuff-color, speckled similar to the E. Corollata. Water or alcohol takes up its active properties. It has not been accurately analyzed, but is supposed to contain caoutchouc, resin, gum, and perhaps starch. Its *incompatibles* are probably the same as those of the E. Corollata.

Properties and Uses.—It very much resembles the E. Corollata in its actions upon the system, but is less energetic. It is emetic, diaphoretic, expectorant, and epispastic; and may be used in the same doses and for the same purposes as the Corollata; in dropsical affections it is preferred by some practitioners. When given in cathartic doses, say from three to ten grains, it is said to promote the menstrual discharge. As an emetic and cathartic it has been found valuable in bilious colic, but is superseded in this disease by the Dioscorea Villosa, which acts promptly and efficiently without any unpleasant symptoms. In dyspepsia one or two grains, repeated three times daily, will be found useful. The dose of the powdered root is from ten to fifteen grains as a hydragogue; one to three grains as an expectorant and diaphoretic. It is occasionally used in jaundice and obstinate torpidity of the liver. It is principally used by physicians as a hydragogue in dropsical affections.

EUPHORBIUM.

Euphorbium.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Dodecandria Trigynia, *Linnæus;* Monœcia Monadelphia, *Michaux.*

THE CONCRETE RESINOUS JUICE OF AN UNDETERMINED SPECIES OF EUPHORBIA.

History.—It is not positively known from what plant this gum-resin is obtained, though Pereira believes it to be the *Euphorbia Canariensis*, of the Canary Isles. In commerce it is found in irregular, yellowish, slightly friable tears, often perforated with one or two holes, united at the base, and usually mixed with the prickles of the plant, and other impurities. They have hardly any odor, and a feeble taste, succeeded by considerable heat and acrimony. Euphorbium is partially dissolved by water, forming a milk-like fluid when rubbed up with it; its best solvents are alcohol, ether, and oil of turpentine. It contains an intensely acrid, reddish-brown resin 43.77; wax 14.93; caoutchouc 4.84; malate of lime 18.82; malate of potassa 4.90; sulphates of potassa and lime, and phosphate of lime 0.70; water and loss 6.44; woody fiber 5.60.—*P.* The powder of Euphorbia is yellowish, and requires to be made with great caution, as it excites violent sneezing, and even inflammation of the eyes.—*Ed.* Thrown on the fire Euphorbium melts, swells, and burns with a pale flame, evolving an odor like that of benzoic acid.

Properties and Uses.—Emetic, cathartic, and errhine. Seldom, however, used for these properties, on account of its severity of action. Its principal use is externally as a rubefacient or vesicant. The following preparation forms an excellent counter-irritant: Take of powdered Euphorbium half a drachm, coarsely powdered cantharides, and mezereon bark, of each two drachms, rectified spirits of wine two and a half fluidounces. Mix together, digest for eight days, then press and filter, and to the filtered tincture add, white colophony one ounce, white turpentine six drachms. With this preparation, paper or silk may be coated three several times, by means of a soft sponge, and which, when dry, forms a excellent irritating plaster in rheumatic, gouty and neuralgic pains.

EUPHRASIA OFFICINALIS.

Eyebright.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES.

Description.—This is an elegant, little, annual plant, with a square, downy, leafy *stem*, simple or branched, and from one to five inches in height. The *leaves* are almost entirely opposite, ovate or cordate, downy, strongly ribbed and furrowed, the lowest crenate, the floral with sharp, tooth-like serratures. The *flowers* are axillary, solitary, very abundant, inodorous, with a brilliant variety of colors. The *corolla* varies much in size as well as in color, being commonly white, with deep purple streaks, and a yellowish palate. *Upper lip of the corolla* galeate, emarginate, two broad and spreading lobes; lower lip larger, spreading, three-cleft, the lobes obtuse or notched. *Calyx* campanulate, four-cleft. *Stamens* four, fertile, under the upper lip; *anthers* violet, lower cells of the upper ones with a long spur. *Pod* oblong, flattened; *seeds* numerous, oblong, grooved lengthwise.—*L.*—*G.*

History.—This is a small plant, indigenous to Europe and this country, bearing white or red flowers in July. The leaves are commonly employed; they are inodorous, but of a bitter, astringent taste. Water extracts their virtues.

Properties and Uses.—Slightly tonic and astringent. Used with much benefit in the form of infusion or poultice, in catarrhal ophthalmia; also of service in all mucous diseases attended with increased discharges; and in cough, hoarseness, earache, and headache, which have supervened in catarrhal affections.

FEL BOVINUM.

OX, OR BEEF'S GALL.

Preparation.—As prepared for medicinal purposes, it is dried by spontaneous evaporation, or aided by a very moderate heat, when it becomes of a more or less solid and hard consistence, brown color, and possessing its natural and peculiar odor. The method recommended for its preparation is to pour two or three gallons of the gall into a deep vessel, and let it stand for twenty-four hours. Then pour off the supernatant fluid into a shallow earthen dish. Simmer it away slowly, stirring it all the time until it is dry. Then preserve in glass bottles well stopped. Thus prepared it is of a bright-green color, friable, pulverulent, slightly aromatic, of a bitter, peculiar taste, and attracting moisture from the air; it is neutral, and contains azote.

A refined gall is obtained by boiling one pint of it and skimming; then add alum one ounce, and keep it on the fire for some time; to another pint of Gall add one ounce of common salt, in the same manner; keep them bottled, separately, for three months, then decant off the clear liquid; mix them in equal proportions; a thick, yellow coagulum is immediately formed, leaving the refined gall, clear and colorless.—*Gray.*

History.—The bile of the ox is of variable consistence, being sometimes limpid, but more commonly viscid and ropy; it is a greenish-yellow fluid, of a characteristic sickening odor, and of a taste at first amarous, and then sweet, but exceedingly nauseous. It is denser than water, but mixes with this fluid in every proportion. Chemists have not satisfactorily ascertained its component parts. Its fundamental component appears to be a fatty or resinous acid, termed *Cholic Acid*, $C_{48} H_{39} O_9$, which with *Glycine* or gelatine sugar, forms *Glycocholic Acid*, $C_{52} H_{42} NO_{11} + HO$. Cholic Acid also forms another compound with *Taurine*, a neutral substance containing 25 per cent. of sulphur, called *Taurochloric Acid*, $C_{52} H_{45} NS_2 O_{14}$. In addition to these, bile also contains a peculiar crystallizable fatty matter, *Cholesterin*, $C_{36} H_{32} O$; brown coloring matter, bile pigment, *Cholepyrrhin*, or *biliphæin;* green pigment or *biliverdin;* bilifulvin; hæmatoidin; alkaline taurocholates and glycocholates, as of soda, lime, etc.; salts of magnesia, iron, etc.; free fatty matter, etc., etc. Those who desire further information are referred to *Lehman's Physiological Chemistry* and *Lehman's Chemical Physiology.* Ox Gall is dissolved by alcohol or water, but not by ether.

Properties and Uses.—Hepatic, aperient, and tonic. Used in intermittents, dyspepsia, torpor of the liver, colic, constipation, diarrhea, dysentery, etc. Five or eight grains of inspissated gall neutralize the constipating and narcotic effects of one grain of opium, without injuring its sedative influence. Dose from one to ten grains.

FERRUM.

Iron.

History.—There is no metal of more utility to mankind, whether civilized or not, or more abundantly dispersed throughout the globe than Iron. Independently of its existence in the form of ores, it is found to a greater or less extent as a constituent of earths, minerals, and organized substances. It is found in meteoric stones, frequently in its pure state; and forms an essential constituent of the blood, in man, and many animals; and is one of those metals which, under certain circumstances, may be employed medicinally, with safety and advantage to the human constitution.

Iron occurs in its native state, and in combination with other substances forming what are called iron-ores. Its most common ores are the sulphuret of iron, or iron and magnetic pyrites; magnetic, red and brown hematite, micaceous, and clay iron ores; and the carbonate, phosphate, sulphate, arseniate, oxalate, etc., of iron. A superior iron is obtained from those ores known as magnetic, red hematite, or micaceous; these are found in abundance in Sweden. Spain, France, and Germany likewise furnish the carbonate or clay iron ore, brown hematite, etc. In this country iron is procured in large quantity, principally from the magnetic, micaceous, and clay iron ores, and some of the ores, especially those the Atlantic States, are equal if not superior to the best ore from Sweden.

As the character of the ores differs, the modes of procuring the iron from them will vary according to the kind of ore. As a general rule, the ore broken into small pieces is mixed with small coal and laid to a height of six or seven feet on large pieces of coal, forming a narrow heap, but as long as the ground will permit. The combustion is begun at one end, and allowed to proceed till it reaches the furthest extremity. The result of this is roasted Iron. The ore thus prepared is mixed with flux and fuel, and exposed to a strong heat in a blast furnace. The flux is generally limestone, which separates the alumina and silica; the fuel is charcoal, coke, or anthracite. The impurities which fuse with the flux are termed the *slag*, which floats above the melted Iron, and flows in a constant but slow stream over the dam, on the opposite side from that where the metal is to flow. As soon as the process is perfected, the orifice through which the slag flowed is closed, the blast stopped, and the melted iron is run into molds, forming what is known as "pig iron." As these "pigs" are impure, they undergo another process to refine them. They are again melted and exposed to the action of the air, being constantly agitated by a rod, by which means the carbon is almost wholly removed, and the other foreign substances, as phosphorus, sulphur, etc., are reduced and swim on the surface. When this process is perfected, the metal is run out over a broad surface, forming a layer two or three inches thick, on which a quantity of cinder collects, and which is cooled by throwing on water. The white hard metal thus formed passes through another process called "puddling." The Iron is arranged around the edges of a reverberatory furnace, heat is applied to it, the metal softens; it is stirred and gradually falls to pieces. The fire is then lowered, and the stirring continued till the metal is reduced to the consistence of sand; much carbonic oxide is evolved, and when this ceases, the heat is raised and the stirring continued. The particles gradually cohere together, the Iron is collected into balls, and the heat raised to a welding temperature. It is now removed from the furnace, and either hammered or made into long flat or round pieces, forming the ordinary soft or malleable Iron.

Iron has a grayish color, and when pure it is whitish-gray, or almost silver white: its fracture is granular, or irregularly foliaceous, with a metallic luster; when polished it has a great deal of brilliancy, which is rapidly lost under exposure to both moisture and air combined. Its taste is peculiar and somewhat astringent, and it emits a peculiar smell when rubbed. It has great tenacity and ductility, and considerable malleability, but not so much as gold, silver, copper, etc. Its specific gravity is 7.788, but diminishes by rolling or drawing. It fuses only at a very intense heat, 3,300° F. It is attracted by the magnet, and is itself the substance which constitutes the loadstone. When iron wire, having a little cotton tied to its extremity, is plunged into oxygen gas while the cotton is in flames, it takes fire and burns with great brilliancy. A damp atmosphere soon tarnishes its surface, gradually changing it into a brown or red powder, well known under the name of *rust*, and which is a hydrated sesquioxide. As far as is known at present, Iron combines with only two proportions of oxygen, and forms two oxides, the *protoxide* ($Fe\,O$), and the *peroxide* or *sesquioxide* ($Fe_2\,O_3$); these united in various proportions form the *black* oxide $Fe\,O + Fe_2\,O_3 = Fe_3\,O_4$. A Ferric acid, or teroxide of iron has likewise been described; it is hardly known in a separate state, and is very easily decomposed. Iron unites readily with sulphur, with iodine if moisture be present, with most of the metals, and with all the non-metallic elements, except hydrogen and nitrogen. It forms salts with the acids, which are generally soluble and crystallizable.—*T.*—*P.*

The *protoxide of Iron*, $Fe\,O$, has a deep blackish-blue color, and its tendency to absorb oxygen from the atmosphere is so great that it can not be preserved; it is almost unknown in a dry or separate state. It combines with acids, forming salts which have generally a greenish color, as sulphate of iron. It burns with great splendor when in contact with the air, and is changed into the peroxide, or sesquioxide. Its salts, for the most part, pass into sesquioxide salts, from their absorption of oxygen. Hence, they act in some cases as deoxidizing agents. Gold is completely reduced from its solutions by protosulphate of iron. Protoxide of iron is influenced by the magnet.

The *sesquioxide*, or *peroxide* of Iron $Fe_2\,O_3$, occurs native as red hematite and specular iron ore. It may be prepared artificially by calcining pure, dried green vitriol; when the protoxide is oxidized at the expense of the sulphuric acid, and water along with sulphuric and sulphurous acids is expelled. It is of a red, or brownish-red color, and is used for polishing plate, being known as jeweler's rouge, or colcothar of vitriol. After strong ignition it becomes almost black. The salts formed by it have a reddish, or brownish-red color. It is not influenced by the magnet. *Hydrated sesquioxide of Iron* is formed by exposing the metal to a moist air; it is of a russet-color, and when dry forms a brown powder, erroneously named carbonate of Iron. It may also be obtained by another process. *See Hydrated Sesquioxide of Iron.*

The native magnetic oxide of Iron, or black oxide, is a heavy, black mineral, strongly attracting iron filings or steel. Its formula is $Fe_3 O_4$, and $Fe_4 O_5$. It is a compound of the protoxide and sesquioxide, and is formed when iron is heated red hot and hammered, as with the black scales in smith shops.

The smallest portions of iron may be discovered by exposing it to the action of nitric acid at a boiling temperature, which reduces it to a peroxide; this becomes dark blue when ferrocyanuret of potassium is added to it, and black with tincture of galls.

Properties and Uses.—Iron in its metallic form has no action on the system; when swallowed in this state it becomes oxidated, apparently at the expense of the water in the stomach, for eructations take place, having a disagreeable chalybeate taste, and an odor of hydrogen. It is usually given in the form of iron filings, in doses of from five to ten grains. The proper method of obtaining iron filings for medical purposes, is to take a piece of soft, malleable, pure iron, and file it down; those obtained from the blacksmith's workshop, whether cleansed by the magnet or not, are impure and not fit for internal administration. Iron wire is generally sufficiently pure for the preparation of filings.

The various ferruginous preparations are termed chalybeate tonics; most of them also possess astringent properties. When taken for some time in small doses, they have the property of strengthening and sometimes accelerating the pulse, improving digestion, exciting the functions of the various organs, and augmenting the number of the red or coloring particles of the blood. When administered internally, Iron, probably, enters the blood, as, after its exhibition, it has been detected in the urine, milk, and blood. Whether it increases the Iron of the blood, is still an unsettled question, although it renders that fluid more florid. When Iron has been taken to too great an extent, it produces more or less thirst, pain in the head or a sense of fullness, increased heat of the body, dizziness, laborious respiration, distension of the limbs, and other manifestations of vascular excitement. The indications for the use of the preparations of iron, are, " debility, feebleness and inertia of the different organs of the body, atony (marked by a soft, lax, or flabby condition of the solids), and defect of the red corpuscles of the blood—as where there is a general deficiency of this fluid (*anœmia; oligœmia*) or a watery condition of it (*hydrœmia; serous crasis; leucophlegmatic temperament*)."—*P.* They have been efficaciously employed in chorea, hypertrophy of the spleen, neuralgia, uterine debility, scrofula, leucorrhea, rachitis, anemic and chlorotic conditions, chronic discharges from enfeebled and relaxed mucous tissues, chronic paralysis, atonic dyspepsia, etc. The therapeutical influences of the several medicinal salts of Iron are nearly the same, but where they become improved or qualified by union with other agents, reference will be made thereto under their respective captions. When Iron is in the form of protoxide it is generally more active than where it is present as a sesquioxide. The preparations of iron are contra-indicated in fever, acute inflammation, congestion of important organs, intestinal irritation, in persons subject to determinations of blood to the head, or affected with habitual constipation.

Off. Prep.—Ferri Acetas; Ferri Carbonas Saccharatum; Ferri Citras; Ferri et Quiniæ Citras; Ferri et Morphiæ Tartras; Ferri et Quiniæ Tartras; Ferri et Saliciniæ Tartras; Ferri Ferrocyanuretum; Ferri Iodidum; Ferri Lactas; Ferri Nitras; Ferri Oxidum Hydratum; Ferri Oxidum Rubrum; Ferri Perchloridum; Ferri Phosphas; Ferri Pulvis; Ferri Subcarbonas; Ferri Sulphas; Ferri Sulphas Exsiccatum; Ferri Tannas; Ferri Valerianas.

FICUS CARICA.

Fig.

Nat. Ord.—Urticaceæ; Moraceæ, *Lindley*. *Sex. Syst.*—Polygamia Diœcia.

THE DRIED FRUIT.

Description.—The Fig-tree is usually about ten or twelve feet in height, but in warm latitudes exceeds this by eight or twelve feet additional. The trunk is crooked, usually about a half a foot in diameter, with a grayish or grayish-brown bark, and round, green, or russet *branches*, covered with a coarse short down. The *leaves* are alternate, large, rough on the upper side, coarsely downy beneath, cordate, three or five lobed, or almost entire, coarsely serrated, and petioled. The *flowers* are green, and placed upon the inside of a turbinate, fleshy, closed receptacle, in the axils of the top leaves; *male flowers*, near the umbilicus, three stamens, calyx three-lobed; *emale flowers*, calyx five-lobed, ovary one. The *receptacle* or *fruit* is solitary, axillary, more or less pear-shaped or almost round, succulent, sweet and pleasant to the taste. *Seeds* small, numerous.—*L.*—*Wo.*

History.—The Fig-tree is believed to be a native of Persia and Asia Minor, but at present raised in all mild latitudes. The structure of its fruit is peculiar; at first it is nothing more than a fleshy receptacle; but, as it advances to maturity, minute flowers form in a cavity which occupies the center of the mass and communicates outwardly by a small round aperture at the summit, and these flowers are succeeded by many small roundish seeds. While young, the Fig abounds, like the trunk and branches, with a milky, aromatic, acrid juice, destitute of sweetness; but as it matures, sugar and mucilage are formed, and the acridity disappears. Its shape is generally turbinate or pear-shaped, of the size of an apricot, of various colors, some being whitish, others reddish or yellow, with a small pit or depression at the larger end, and of an agreeable, sweet, mucilaginous taste, and when ripe, is sweet, high-flavored, and wholesome; but if eaten to excess, occasions flatus, intestinal pains, and looseness of the bowels. When ripe, Figs are generally dried in the sun, sometimes in ovens, and are packed in baskets or drums. The Smyrna Figs are the ones commonly met with in this country; they are more or less flattened by pressure, and are covered with saccharine granules, which in summer contain numerous minute insects, are of a yellowish or brownish color, and rather translucent. They contain sugar of Figs 62.5, fatty matter 0.9, extractive with chloride of calcium 0.4, gum with phosphoric acid 5.2, woody fiber, seeds, and water 16.0.—*P.*

Properties and Uses.—Figs are nutritive, emollient, demulcent, and aperient, and are used in costive habits, and to flavor gruels, decoctions, etc. Roasted or boiled, they may be applied as a suppurative poultice to gum-boils, boils, buboes, carbuncles, etc.

FIRING.

Obtain a thick iron-wire shank, about two inches long, and inserted into a small wooden handle; on its extremity, which must be slightly curved, have a disk or button of iron, exactly one-quarter of an inch thick, and half an inch in diameter. The whole instrument to be only six inches in length. The face of the disk for application must be flat.

Mode of application.—Light a small spirit-lamp and hold the button over the flame, keeping the fore-finger of the hand holding the instrument, at the distance of about half an inch from the button. As soon as the finger feels uncomfortably hot, the instrument is ready for use, and the time required for heating it to this degree, will be about half a minute. It is to be applied as quickly as possible to the parts, the skin being tipped successively, at intervals of half an inch, over the affected part, as lightly and rapidly as possible, always taking care to bring the flat surface of the disk fairly in contact with the skin. In this way the process of firing a whole limb, or the loins, making about one hundred applications, does not occupy a minute, and the one heating by the lamp suffices. To ascertain whether the heat be sufficient, look sidewise at the spots as you touch them, and each spot will be observed to become of a glistening white, much whiter than the surrounding skin. In from five to thirty minutes the skin becomes bright red, and a glow of heat is felt over the part. The iron must never be made red-hot—it is very little hotter than boiling water—should never make an eschar, and rarely raise a blister. On the next day after its application, a number of circular red marks will be seen on the skin, the cuticle not even being raised, and the surface ready, if necessary, for a fresh application. There is no discharge whatever, and in most cases the patient is unconscious of what has been done. It is vastly superior to a blister in many cases; even the most delicate female will not object to its frequent repetition when required.

Properties and Uses.—A powerful counter-irritant. Recommended by Dr. Corrigan in paralysis, local muscular rheumatism, sciatica, lumbago, neuralgic pains, etc., and wherever a counter-irritant is required. Also applied each side of the spinal column, in intermittents, epilepsy, mania and other diseases.

FŒNICULUM VULGARE.

Fennel.

Nat. Ord.—Apiaceæ, or Umbelliferæ. *Sex. Syst.*—Pentandria Digynia.

THE SEED.

Description.—Fœniculum Vulgare, or *Common Fennel*, is a biennial or perennial plant, with a whitish, tap-shaped root, the whole herb being smooth, and of a deep glaucous green. The *stem* is three or four feet high, erect, solid, round, striated, smooth, leafy, and copiously branched. The *leaves* are alternate, triply pinnate; *leaflets* acute, thread-like, long, more or less drooping; *petioles* with a broad, firm, sheathing base. The *flowers* are in large, terminal, very broad, flat umbels, with very numerous, smooth, angular, rather stout rays; the partial rays much more slender, short, very unequal. *Bracts* or *involucres* wanting. *Calyx* none. *Styles* very short, with large, ovate, pale-yellow base. *Fruit* ovate, not quite two lines long, and about a line in breadth, pale bright brown, smooth; *ridges* sharp, with but little space between each, the lateral ones rather the broadest; terminated by a permanent conical disk. Fennel is a native of Europe, growing wild upon sandy and chalky ground, and flowering in July.—*L.*

FŒNICULUM OFFICINALE, or *Large Fennel*, is very much like the preceding, and the two are sometimes confounded; but its leaves are smaller, the leaflets shorter, the fruit paler, twice as heavy, and much longer, somewhat curved, and of a sweeter and more agreeable taste.—*L.* It inhabits the southern parts of Europe, and is naturalized in this country.

FŒNICULUM DULCE, or *Sweet Fennel*, and sometimes confounded with the F. officinale, has somewhat the appearance of F. vulgare, only it is not so large, seldom exceeding twelve inches in height, and the rays of its umbels being less in number by at least one-half; the fruit likewise varies considerably, being narrow, oblong, three lines long, pale dull-brown, smooth; ridges sharpish, with a space between each for a convex line indicating the vittæ, the lateral ones rather the broadest. It inhabits the same countries as the preceding variety, and is cultivated for culinary purposes.

At one time, these plants were placed in the genus *Anethum*, Linn., but De Candolle and Gærtner removed them to the present genus on account of the dissimilarity of the seed. Authors have not settled the question as to the officinal species, the botanical history of which is still a matter of indefiniteness.

History.—The seeds or mericarps of these plants possess nearly the same peculiar, agreeable, spicy odor and flavor. There are three kinds in commerce: 1st. Those of the *F. vulgare*, which are somewhat egg-shaped, smooth, striated, two lines being more conspicuous, and of a dull color. 2d. Those of the *F. officinale*, which are longer than the preceding, slightly arched, paler color, with the stalks frequently attached to them, and of a more agreeable flavor. 3d. Those of the *F. dulce*, which are more conspicuously striated, of greater diameter, and, instead of being green as the two preceding, of a dull-brown color. Water, at 212°, takes up their properties by infusion, but not so thoroughly as alcohol. The aromatic properties of these seeds are due to a volatile oil.

Properties and Uses.—Carminative and stimulant. Used in flatulent colic, and as a corrigent of unpleasant medicines. Dose of powdered seeds, from ten to thirty grains.

Off Prep.—Aqua Fœniculi.

FRAGARIA VESCA.

Strawberry.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE FRUIT.

Description.—Strawberry is a perennial plant, with a creeping, knotty root. The *stems* are trailing, with stolons often creeping several feet. The *leaves* are *pubescent*, trifoliate; the *radical ones* on long footstalks; *leaflets* obovate-wedge form, coarsely serrate, subsessile; *stipules* lanceolate, oblong, cohering with the base of the petiole. *Flowers* on scapes white, one or several; *peduncles* erect or nodding. *Calyx* concave, deeply five-cleft, with an equal number of alternate exterior segments or bracteoles; *petals* five, obcordate. *Stamens* numerous, small; *styles* deeply lateral; *stigmas* sessile, small; *ovaries* numerous. *Receptacle* in fruit much enlarged and conical, becoming pulpy and scarlet, bearing the minute dry achenia scattered over its surface. In this species the *achenia* are superficial on the conical or hemispherical fruiting receptacle, not sunk in pits; in the *F. Virginiana* the *achenia* are imbedded in the deep pits of the receptacle.—*W.*—*G.*

History.—This is a European species, presenting exhaustless varieties, which are extensively cultivated, flowering from April to May, and ripening its fruit in May and June. The *F. Virginiana*, or Wild Strawberry, *F. Canadensis*, or Mountain Strawberry, *F. Grandiflora*, or Pineapple Strawberry, and the other varieties possess similar properties. The fruit of all the varieties is highly fragrant and delicious when ripened in the sun; and the cultivated varieties frequently become very large, weighing an ounce or more. Strawberry consists of equal parts of citric and malic acids, sugar, mucilage, pectin, water, peculiar volatile aroma, woody fiber, and pericarps.

Properties and Uses.—The fruit has been highly spoken of in calculous disorders, used very freely, likewise in gout, and the juice will dissolve the hard concretions called "tartar," which form on the teeth, and without injuring them. With some, strawberries disagree, causing disordered digestion, and frequently a rash-like eruption on the surface. The grains or seed-like pericarps are indigestible, and sometimes cause irritation of the bowels. Strawberry-juice, or the syrup, added to water, forms a refreshing and useful drink for febrile patients; care being taken that the grains are removed by filtering or expressing the juice or syrup through a piece of muslin. Strawberries eaten with cream are injurious to dyspeptics. The leaves are slightly astringent, and have been used, in infusion, in diarrhea, dysentery, and intestinal debility; the roots are diuretic, and have been beneficially used, in infusion, in dysuria, gonorrhea, etc. The leaves of the Wild Strawberry, gathered after the ripening of the fruit, and dried in the sun, or in heated pans, afford a greenish and slightly astringent infusion, like that of the Chinese tea, with similar diaphoretic, diuretic, and excitant properties.

FRASERA CAROLINENSIS. (*Frasera Walteri.*)

American Columbo.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—American Columbo is an indigenous plant, with a triennial, long, fusiform, horizontal, rugose, and yellow root, and a smooth, erect, solid, cylindrical, or subquadrangular, succulent, dark-purple *stem*, from four to nine feet in height, one or two inches in diameter at the base. The *leaves* are smooth, oblong-lanceolate, acutish, sessile, feather-veined, entire or wavy, subcarnose, from three to twelve inches by one to three, in whorls of four to six, rarely opposite, and decreasing in size as they approach the summit. The *flowers* are tetramerous, an inch and a quarter in diameter, yellowish-white or greenish-yellow, with brown-purple dots, and a large purple pit or gland near the base bordered by a strong and even fringe; and are in terminal, compound, pyramidal, leafy, or bracteated, verticillate panicles. *Calyx* deeply four-parted, segments acute, shorter than the oblong, obtusish petals; *corolla* wheel-shaped. *Stamens* four, shorter than the corolla, alternating with its segments; *filaments* subulate; *anthers* large, oblong, versatile, yellow; *ovary* oblong, attenuated into a short style; *stigma* bifid, distinct; *capsule* or *fruit* oval, compressed, acuminated with the persistent style, yellowish; *seeds* few, large, imbricated, elliptical, wing-margined.—*L.*—*G.*—*W.*

History.—This plant grows west of the Alleghanies, on the borders of lakes and in rich soils in the Middle and Southern States, bearing flowers in June and July, which, however, together with the stems, are not developed until the third year, the root-leaves only, in the mean time, being visible. The part used is the root, which should be gathered in October and November of the second year of the plant, or in March and April of its third year; it is hard, fusiform, and wrinkled; as met with in the shops they are in dried, transverse slices, with a brown epidermis, slightly tinged with red, yellow cortex, and a spongy, straw-colored center. Its taste is amarous and slightly saccharine; and its properties are taken up by wine, water, or alcohol of sp. gr. 0.935. Its alcoholic solution gives a precipitate with water, but remains unaffected when tincture of galls is added. Mr. Douglass found it to contain gum, tannic acid, resin, gallic acid, a fatty substance, bitter extractive, saccharine matter, etc.—*Am. Jour. Phar. VI.*, 177.

The root of this plant has been mistaken for that of Colombo, but it may be determined from the latter, which, on account of the starch it contains, strikes a blue color with tincture of iodine, while the American plant undergoes no change of color. Sulphate of iron produces a blackish-green color, with an aqueous solution of the American root, but does not affect the foreign root. Tincture of galls gives a dirty-gray precipitate when added to the Tincture of Colombo. A transverse section of Colombo shows a series of concentric circles, with diverging lines, which are absent in the American root.

Properties and Uses.—The recent root of American Columbo is said to cause purging and vomiting; but when dried it is a simple tonic, which may be used wherever mild tonics are indicated. Dose of the powder, from twenty to sixty grains; of the infusion, from one to four fluidounces, three or four times a day.

Off. Prep.—Infusum Fraseræ.

FRAXINUS SAMBUCIFOLIA.

Black Ash.

FRAXINUS ACUMINATA.

White Ash.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diœcia Diandria.

THE BARK.

Description.—Fraxinus Sambucifolia is a tree which attains the height of from forty to seventy feet; the *trunk* is covered with a bark of a darker hue than that of the White Ash, and less deeply furrowed, and is from one to two feet in diameter. The wood is purplish, very tough and elastic, less durable than the White Ash. The leaves are from nine to sixteen inches in length, and are composed of about seven *leaflets*, which are sessile, ovate-lanceolate, serrate, rugose and shining, round-oblique at the base, smooth above, and red-downy on the veins beneath. *Calyx* and *corolla*both wanting; buds of a deep-blue color. *Samara* elliptical-oblong, very obtuse at both ends. This species grows in swamps and moist woods in the Northern States and Canada, blossoming in May. The young saplings are much employed in making hoops, and the mature trunks for baskets. The leaves when bruised exhale the odor of Elder.—*W. G.*

FRAXINUS ACUMINATA of Lamark, or the *Fraxinus Americana* of Linnæus, is a large forest tree, which grows from fifty to eighty feet high; it often rises more than forty feet without a branch, and then expands into a regular summit of an equal additional height. The *trunk* is covered with a gray, furrowed and cracked bark, and the branchlets are a smooth greenish-gray. The *leaves* are a foot or more in length, opposite, pinnate, consisting of about seven *leaflets*, which are petiolate, oblong, shining, acuminate, entire or slightly toothed, glaucous beneath. Its *flowers* are whitish-green, and are disposed in loose panicles, the fertile ones with a calyx, and the barren ones without. *Corolla* wanting. *Calyx* small and four-cleft; buds of a rust color. *Samara* spatulate-linear, obtuse, with a long narrowed base. The White Ash is chiefly confined to the Northern States and Canada, growing in rich woods, and blooming in April and May. Its wood is light, firm, elastic and durable, furnishing a most excellent timber for carriage-frames, bars, handspikes, agricultural implements, etc.— *W. G.*

History.—There are several species of this tree, all of which possess medicinal virtues, probably, of a similar character. The bark is the part used, the properties of which are extracted by water. No analysis has been made of it.

Properties and Uses.—Tonic and astringent. An extract of the Black Ash used as a plaster is very valuable in salt rheum, and other cutaneous diseases. The infusion may be used internally as a tonic, and for all purposes where a combination of astringency with tonic influence is indicated.

The White Ash is also cathartic, and has been found beneficial in some cases of constipation, and also in dropsical affections. It may be used in the form of infusion, or in bitters. The bark in white wine, is said to be efficient in curing ague-cake, or enlarged spleen. The seeds are said to prevent obesity.

The leaves of the common Ash, *Fraxinus Polgyamie*, have been highly recommended in the treatment of gout and rheumatism. No nausea, sickness, general discomfort, nor depression attends their employment, and generally, after having used them for four or five days, and sometimes sooner, the pain, redness, and swelling sensibly diminish in intensity, or entirely disappear. About two and a half ounces of the powdered leaves are to be infused for three hours in a sufficient quantity of boiling water, then strained through a linen cloth and sweetened; this is to be taken during the day, at several draughts, and is to be repeated daily; it should be continued for eight days after the symptoms have disappeared. In chronic gout it may be repeated for eight or ten days every month, for several consecutive months. Probably the leaves of the above species, or of the *Fraxinus Quadrangulata*, or *Blue Ash*, will be found equally efficacious.

FUCUS HELMINTHOCORTON.

Corsican Moss.

Nat. Ord.—Algaceæ, or Ceramiaceæ, (*Lindley*). *Sex. Syst.*—Cryptogamia Algæ.

THE WHOLE PLANT.

Description.—This is the *Gigartina Helminthocorton* of Greville; it has a cartilaginous, terete, tufted, entangled *frond*, with setaceous *branches*, somewhat dichotomous, marked indistinctly with transverse streaks. The lower part dirty-yellow, the branches more or less purple.—*L.*

History.—This is a marine plant, growing on the Mediterranean coast, and especially on the Island of Corsica. The plant is of a cartilaginous consistence, of a dull and reddish-brown color, has a bitter, salt and nauseous taste, and its odor is rather pleasant. It is found in the form of thick tufts, composed of numerous filaments, united at the base, in bundles intermingled together, and fastened to each other by small hooks, with which the stems are furnished. It is seldom employed in this country. Water dissolves its active principles.

Properties and Uses.—Anthelmintic. The influence exercised by this substance upon the economy, is hardly appreciable; perhaps, occasionally, a slight irritation of the digestive canal—but it acts very powerfully on the intestinal worms, especially the lumbricoid. Dr. Johnson affirms that when thrown into the rectum, "it destroys any worms domiciliating there as effectually as choke-damps would destroy the life of a miner." The dose is from ten to sixty grains, mixed with molasses, jelly, or syrup, or in infusion.

FUCUS VESICULOSIS is a perennial seaweed. The *root* is a hard flattish disk. *Frond* from a few inches to four feet in length, and from two lines to an inch in width, flat, furnished with a midrib throughout its length, occasionally twisted in a spiral manner, repeatedly dichotomous, the angles of the dichotomy acute, except when a solitary vesicle happens to be placed there; the sterile branches obtuse and often notched at the extremity. Air-vessels from the size of a pea to a hazelnut, in pairs, and situated at irregular intervals in different parts of the frond; sometimes two or three pairs are arranged next to each other; they are rarely altogether wanting. Receptacles terminal, compressed, mostly ovate or elliptical, about half an inch long, but varying from nearly spherical to linear-lanceolate, and from one fourth of an inch to nearly two inches long; they are mostly in pairs, but are sometimes solitary, and occasionally forked. They are filled with a clear, tasteless mucus. The whole frond is proliferous in a remarkable degree in cases of injury, throwing out numerous new shoots from the injured part.—*L.*

The FUCUS VESICULOSIS, *Sea-Wrack*, or *Bladder Fucus*, is a very common marine plant, growing upon the sea shores of Europe and America.

Its substance is rather thick, but flexible and tough, with a dark, olivaceous, glossy green color, paler at the extremities, and becoming black by drying. Its odor is strong, and its taste quite disagreeable, and it contains cellulose, mucilage, mannite, odorous oil, coloring and bitter matters, soda, iodine, potassium, etc. On account of the iodine contained in its charcoal; it has been found beneficial in scrofulous enlargements of the glands; the plant being incinerated in a covered crucible, and the charcoal given in doses of from ten grains to two drachms. When burned in the open air, it yields *kelp;* it is used as a manure in some places, and is also fed to cattle during the winter. Probably other species of Fucus have analogous virtues.—*P.*

FULIGO LIGNI. (*Fuligo Splendens.*)

WOOD-SOOT.

Description.—The best Soot for medicinal purposes, is that which is gathered within an air-tight wood stove and its pipe; that which is collected from a clean chimney or ordinary stove-pipe, where hard wood alone is burned, will ordinarily answer, if it be free from ashes and lime. Soot has a peculiar odor, somewhat resembling that of creasote, and a nauseously empyreumatic, more or less bitter and acrid, saline taste. Its infusion in water is of a dark-brown color, with the characteristic odor and taste of Soot. It is a mixture of distilled products from the imperfectly burnt wood, ashes, or other fixed matters, carried up the chimney by the current of air. It consists of an empyreumatic resin, *pyretin*, combined with *acetic acid*, which also saturates the bases, lime, potassa and magnesia of the ashes carried up the chimney. Acetate of ammonia, chloride of calcium, sulphate of lime, extractive matter, creasote, carbon, silica, sesquioxide of iron, have all been found in Soot. The solution of Soot, evaporated, furnishes a dark-colored extract, which on being redissolved in water forms a dark-brown solution, and from which acid pyretin is precipitated when any free acid, except the acetic, is added to it. About 0.44 of Soot is insoluble.

Properties and Uses.—Internally, Soot will be found valuable in all forms of disease attended with acidity of the stomach. A powder composed of one part each of powdered rhubarb and Soot, and half a part of bicarbonate of potassa, will be found invaluable in all such cases, removing acidity and a tendency to constipation; it may be given in doses varying from three to twelve grains, three times a day, or in sufficient quantity to cause one or two evacuations from the bowels daily. An infusion of Soot, made so as not to be unpalatable, is very beneficial in inflammation of mucous membranes, and in hysteria. A strong decoction of Soot used as an injection into the rectum, has caused the expulsion of ascarides; its use should be continued for several days in succession; injected into the bladder it has been of service in chronic inflammation of the bladder;

it should be injected twice a day for some days. It possesses no antispasmodic virtues further than the neutralizing acidity of the stomach, to which the spasmodic action is owing. Combined with geraniin, in the proportion of two parts to one of the astringent, it will prove valuable in diarrhea and cholera-morbus of children; in summer-complaint, one part of leptandrin, and a fourth part of camphor or ginger may be added to the above. The infusion or decoction may be made by adding one or two ounces of Soot to a pint of water, macerate or boil for half an hour, and filter; dose, one or two fluidounces, two or three times a day.

Externally, I have used the Unguentum Fuliginis, in cases of recent and extensive burns, with almost immediate relief; it must be spread on raw cotton and applied over the part. The ointment is also efficacious in various cutaneous disorders, especially those of an erysipelatous character, tinea, fistula, cancerous and syphilitic ulcers, pruritus of the vulva, specks on the cornea, scrofulous ophthalmia, severe burns and scalds, etc. In some of these diseases the decoction will answer. In many ophthalmic diseases, a strong decoction of equal parts of Soot and golden-seal, will be found valuable; it may also be employed internally by mouth, or injection into the bladder or vagina, for chronic mucous inflammation.

A preparation called *Fuligokali*, has been recommended in scrofula, chronic rheumatism, rheumatic tumors, and certain herpetic affections. It is made thus: To two or three parts of water add fifty parts of good, shining powdered Soot, and ten parts of caustic potassa; boil the mixture for an hour, then dilute it when cold, and filter. The filtrate, when evaporated to dryness, yields a black powder, having a slightly alkaline taste, a burnt-like odor, and a ready solubility in water. It may be given four or five times a day, in doses of two or three grains. This substance should be kept in well closed bottles.—*Deschamps.* A stimulating discutient external application is made by triturating half an ounce of prepared lard with eight or sixteen grains of fuligokali.—*Gibert.*

Off. Prep.—Unguentum Fuliginis.

FUMARIA OFFICINALIS.

Fumitory.

Nat. Ord.—Fumariaceæ. *Sex. Syst.*—Diadelphia Hexagynia.

THE LEAVES.

Description.—This is an annual glaucous plant, with a suberect, much-branched, spreading, leafy, and angular *stem*, growing from ten to fifteen inches high. The *leaves* are mostly alternate, bipinnate or tripinnate; *leaflets* wedge-shaped, cut into flat, lanceolate segments. The *flowers* are small, flesh-colored, tipped with crimson, nodding, the pedicels becoming erect in fruit. *Racemes* opposite to the leaves, stalked, erect, many-flowered, rather lax. *Bracts* lanceolate, acute, not half the length of the pedicels, especially when in fruit. *Petals* four, unequal, one of them with a short, rounded spur at the base. *Calyx* colored, toothed, deciduous. *Fruit* or *nut* ovoid or globose, indehiscent, emarginate, one-seeded, and valveless; *seeds* crestless.—*W.*—*G.*

History.—This plant is found growing in cultivated soils in Europe and this country, bearing red flowers in June and July. The leaves which are used have no odor, but a bitterish taste, and when fresh, furnish a large quantity of an aqueous, bitter, and inodorous juice, which possesses their therapeutical properties, and which is soluble in water, wine, or alcohol. It contains malate of lime, and some bitter extractive principles.

Properties and Uses.—It is a weak tonic, very much used in cutaneous diseases, in jaundice, obstructions of the abdominal viscera, scurvy, and in cases of debility of the digestive organs.—*E. & V.* It is also slightly diaphoretic and aperient. Dose of the infusion, a wineglassful every two or three hours; of the expressed juice, half a wineglassful, two or three times a day. Two ounces of the flowers and tops infused in three pints of Madeira wine, and taken twice a day in doses of from two to four fluidounces, will strengthen the stomach and improve the appetite.

Off. Prep.—Infusum Fumariæ Vinum.

GALBANUM.

Galbanum.

THE GUM-RESIN OF AN UNKNOWN PLANT.

History.—The plant from which the gum-resin *Galbanum* is obtained, is unknown; various plants have at different times been supposed to afford it, but as there is no certainty in relation to the subject, it is scarcely necessary to refer to them. Galbanum is imported from the Levant, and from India in cases and chests. It is generally met with in lumps, consisting of large, irregular masses of a brownish, or dark-brownish color, and composed of agglutinated tears; some few of which, when broken, are somewhat translucent; they have a waxy density, but become soft and sticky at a temperature of 95° to 100° F., are not pulverizable unless in very cold weather, have a strong, unpleasant odor, and a hot, amarous taste, with some acrimony. Occasionally, Galbanum is met with in the form of oval, globular, or irregular tears. On account of the impurities it contains, it should be melted and strained previous to employing it. Thompson says that when the color of Galbanum is dark-brown or blackish, it must be rejected as bad. Inferior Galbanum, according to Christison, is softer, darker in color, opaque, less powerful in odor, and more bitter and less acrid in taste than the best varieties, and usually presents but few or no tears, with an admixture of sand, straw, chips of wood, etc. The specific gravity of Galbanum is 1.212.—*T.*

Galbanum is partially dissolved in water, vinegar, or wine, forming a solution which is milky. Alcohol dissolves about three-fifths of it, the residue being gum. Diluted alcohol is its best solvent. Ether dissolves the resin and volatile oil. When distilled, Galbanum yields about half of its weight of volatile oil, which has at first a blue color, becomes colorless and limpid, having an odor resembling that of Galbanum and camphor, a taste at first hot, but subsequently cooling and bitter, of specific gravity 0.92, and readily soluble in alcohol, ether, and the fixed oils. Meissner found Galbanum to contain resin 65.8, gum 22.6, cerasin or bassorin 1.8, malic acid, with bitter matter, 0.2, volatile oil, 3.4, vegetable debris 2.8, loss 3.4.—*T.*

Properties and Uses.—The effects of Galbanum are similar to those of assafetida and ammoniac, being weaker than the former, but stronger than the latter. It has been used in hysteria, chronic rheumatism, suppressed menstruation, and chronic mucous affections of the air-passages; and may be given in doses of from ten grains to half a drachm, in pill form, or in emulsion. Externally, a plaster is sometimes employed, as a mild stimulant and resolvent to indolent tumors; and the tincture has been efficacious in scrofulous ophthalmia, and irritability or weakness of the eyes.

GALIPEA OFFICINALIS.

Angustura.

Nat. Ord.—Rutaceæ. *Sex. Syst.*—Diandria Monogynia.

THE BARK.

Description.—This tree seldom exceeds twenty feet in height, with a stem whose diameter is from two to six inches, having irregular branches, and a smooth bark. The *leaves* are alternate, trifoliate, petiolate; *leaflets* oval, acute at the base, acuminate at the apex, smooth, glossy, bright-green, having a tobacco-like smell when fresh and bruised, six to ten inches long, two to four broad, some of them marked with small whitish round spots. *Petiole* about the length of the leaflets, slightly channeled. The *flowers* are white, with a narcotic odor, and are in cylindrical, contracted, stalked panicles, longer than the leaves, with the branches about three-flowered. *Calyx* inferior, companulate, five-toothed, hairy; *corolla* somewhat curved before expansion, nearly an inch long, downy on both sides; of the five petals, two larger than the others. *Sterile stamens* five, subulate, tipped with a pellucid, watery gland; *fertile stamens* two; *style* erect; *stigma*, simple. The *fruit* or *carpels* are five, or fewer by abortion, becoming villous as they mature, two-seeded, with a strong, elastic separable two-valved endocarp.—*L.*

History.—There has been heretofore some uncertainty relative to the tree from which the officinal Angustura Bark is obtained, but the question has been definitely settled by Dr. Hancock, who has ascertained that it is chiefly the product of a tree to which he has given the above name. It is found growing in great abundance in the missions of Carony, Tumeremo, etc., and other parts of Columbian Guiana.

The bark, as imported from the West Indian ports, is in flat pieces or incomplete quills, from two to eight inches long, an inch or two in breadth, and one or two lines in thickness. Its outer surface is dirty-grayish-yellow in color, often speckled in the smaller pieces with lighter gray spots and elevations; the inner surface is dull brown; and the substance of the bark is yellowish brown. It breaks easily, the transverse fracture being smooth and somewhat resinous to appearance; its powder has a grayish-yellow color, somewhat like that of rhubarb.—*C.* When soaked in water, it is soon softened sufficiently to be easily divided by means of shears. It has a characteristic, unpleasant odor, and an intensely bitter, somewhat aromatic and acrid taste. Water, alcohol, or proof-spirits, takes up its virtues. Fischer found in it volatile oil 0.3, peculiar bitter principle 3.7, bitter hard resin 1.7, balsamic soft resin 1.9, elastic resin 0.2, gum 5.7, lignin 89.1. By submitting the bark to distillation with water, a yellowish-white, odorous, acrid volatile oil is obtained, which is not so heavy as water. The bark also contains nearly 1.5 per cent. of a peculiar neutral, crystalline principle, named *Cusparin* by Saladin, and termed the *Peculiar Bitter Principle* by Fischer. Cusparin or *Angosturin* (Pereira), is obtained by submitting the alcoholic tincture of the bark (prepared without heat) to slow atmospheric evaporation; the crystals thus obtained are to be purified by repeated crystallization from alcohol, and agitation with ether and hydrated oxide of lead. It forms tetrahedral crystals, is fusible at 112° F., and loses 23.09 per cent. of its weight; cold water dissolves half a per cent., and boiling water one per cent. of it; it is freely soluble in alcohol, but not in ether or volatile oils, readily dissolves in the concentrated acids, and more sparingly in the alkalies, and its acid solution yields a whitish precipitate with the tincture of galls. (*Saladin. Journ. de Chim. Med. IX.* 388.—*T.*) Some years since a poisonous bark was introduced as the true bark, and the administration of which was attended with fatal results. This spurious bark was at first supposed to be the product of the *Brucea Ferruginea*, but is now recognized as the bark of *Strychnos Nux-vomica.* It is known as the FALSE ANGUSTURA BARK, and may be detected by the following marks: the genuine bark has a strong and disagreeable odor, a bitter, durable, pungent taste, softens in water, and imbibes it quickly, is very light, tissue not compact, has a resinous shining fracture, and when touched with nitric acid becomes colored a dull red; the false bark has no odor, an insupportably bitter, very durable taste, does not soften sensibly in water, is very heavy and compact, has a dull and blackish fracture, and nitric acid turns its fractured surface bright red, and its rusty epidermis an intense green. The false bark is rarely met with in this country.—*Duncan.*

Properties and Uses.—In large doses, of from twenty to sixty grains, it is emetic and cathartic; in doses of from five to fifteen grains, tonic and febrifuge. Recommended in bilious diarrheas and dysenteries, intermittents, dropsies, etc. It is seldom used, on account of its liability to adulteration with the poisonous bark of the Strychnos Nux-vomica, known as the *False Angustura Bark.*

GALIUM APARINE.

Cleavers.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE HERB.

Description.—This plant has many common names, as *Goose-grass*, *Catch-weed*, *Bedstraw*, etc.; it is an annual, succulent plant, with a weak, procumbent, quadrangular, retrorsely-prickled *stem*, which grows from two to six feet long, and is hairy at the joints. The *leaves* are one or two inches in length, and two or three lines in width, verticillate in sixes, sevens, or eights, linear-oblanceolate, nearly sessile, mucronate, tapering to the base, rough on the margins and midvein; *peduncles* axillary, one or two-flowered; *flowers* white, small, numerous, scattered. *Calyx* four-toothed; *corolla* rotate, four-parted; *stamens* four, short; *styles* two. *Fruit* large, bristly, with hooked prickles.—*W.*—*G.*

History.—This plant is common to Europe and the United States, growing in cultivated grounds, moist thickets, and along banks of rivers, and flowering from June to September. Its root consists of a few hair-like fibers, of a reddish color. There are several varieties of this plant, all of which possess similar medicinal virtues, as *Galium Asprellum*, or Pointed Cleavers, which differs from the above in having its leaves in whorls of four or six, and smaller, its fruit smooth, its stem less in length, and is perennial; *Galium Verum*, or Yellow Bed-straw, with an erect stem, leaves in whorls of eight, root long, perennial, fibrous, flowers densely paniculate, yellow, and terminal; *Galium Trifidum* or Small Cleavers, with a perennial root, decumbent stem, herb smaller than the others, leaves in fours or fives, and white flowers.

In the green state these plants have an unpleasant odor, but are inodorous when dried, with an acidulous, astringent, and bitter taste. Cold or warm water extracts the virtues of the plants; boiling destroys them. They have not been analyzed. The roots dye a permanent red, and the bones of animals who eat the plant are said to be colored, similar to that caused by madder. The flowers are said to curdle milk, but this is not a constant effect. Analysis has detected in this plant rubichloric acid, gallitannic acid, citric acid, starch, chlorophylle, etc. *G. Aparine* contains more citric acid than *G. verum*, while the latter holds the most gallitannic acid.

Properties and Uses.—A most valuable refrigerant and diuretic, and will be found very beneficial in many diseases of the urinary organs, as suppression of urine, calculous affections, inflammation of the kidneys and bladder, and in the scalding of urine in gonorrhea. It is contra-indicated in diseases of a passive character, on account of its refrigerant and sedative effects on the system, but may be used freely in fevers and all acute diseases. It has been recommended in scorbutic and nervous affections, but can not be depended upon. An infusion may be made by macerating an ounce and a half of the herb in a pint of warm water for two hours, of which from two to four fluidounces may be given three or four times a day, when cold. It may be sweetened with sugar or honey. Equal parts of Cleavers, maidenhair, and elder-blows, macerated in warm water for two or three hours, and drank freely when cold, form an excellent drink in acute erysipelas, scarlatina, and other exanthematous diseases, in their inflammatory stages.

The infusion made with cold water is also considered very beneficial in removing freckles from the face, likewise lepra, and several other cutaneous eruptions; the diseased parts must be washed with it several times a day, and continued for two or three months in cases of freckles. It has also been found useful in many cutaneous diseases, as psoriasis, eczema, lichen, cancer, and scrofula, and is more particularly useful in these diseases when they are combined with a strumous diathesis. The best form of administration is that of the inspissated juice, which may be given in one or two drachm doses three times a day.

Off. Prep.—Infusum Galii.

GAMBOGIA.

Gamboge.

THE GUM-RESIN OF AN UNCERTAIN PLANT.

History.—In relation to the plant from which this gum-resin is derived we have no correct information. By some it is laid down as coming from the *Stalagmitis Cambogiodes*, upon the authority of Murray, but Dr. Graham has satisfactorily determined that there is no such plant in existence. It is now supposed to be derived from trees of Ceylon, which produce gum-resins agreeing closely or entirely with the officinal Gamboge—these are the *Garcinia Cambogia* and the *Hebradendron Gambogioides*, which last is supposed to be the tree from which it is principally had—though on merely presumptive evidence. The *Heb. Gambogioides* belongs probably to the class and order of the sexual system, *Monœcia Monadelphia*, and to the natural order *Clusiaceæ* or *Guttiferæ*. It is a moderate sized tree, with opposite, petiolate, obovate-elliptical, coriaceous, smooth, entire, and abruptly-acuminate, shining *leaves*, dark-green above, and paler beneath. The *flowers* are unisexual, sessile and axillary; the *calyx* membranous, persistent, and consisting of four sepals; the *corolla* four-petaled; the *fruit* is a pleasant, saccharine, quadrilocular berry, about the size of a cherry, crowned with a sessile stigma, and containing one seed in each division.—*L.* Incisions are made into the tree, or a large slice is pared from the bark, from which the juice flows, thick, viscid, and bright-yellow, which is scraped off and dried in the sun. If left on the tree, it speedily concretes into dry tears or irregular masses. It is collected in Siam and Cochin-China, and sent to Canton and Calcutta, from which places it is imported into this country.

The best kinds are the *Pipe Gamboge*, and *Ceylon Gamboge*, which last is seldom had in this country. The Pipe Gamboge consists of cylindrical pieces, varying from three-fourths of an inch to two inches in diameter, frequently hollow, striated externally, and often cohering together forming irregular masses, weighing several pounds. They are brittle, odorless, of a slight taste at first, succeeded by acridity, an orange color, with sometimes an external greenish-yellow dust. Pipe Gamboge has a conchoidal fracture, presenting a smooth, glistening, reddish-yellow surface. Its powder is of a bright yellow color.—*P.*—*C.* It forms a yellow, smooth, rather persistent emulsion with water, and is soluble in the alkalies, and the essential oils; alcohol dissolves all the resin, leaving the gum; water forms only an emulsion with it. Sulphuric ether dissolves most of the resin, and ammoniated alcohol forms a solution with it which is not changed by water. The resin is the active principle. Its specific gravity is 1.221. It is like other resins, dissolved and saponified by caustic potassa. According to Christison, it consists of resin 74.2, or 71.6; arabin or soluble gum 21.8 or 24.0; moisture 4.8, and traces of fecula and woody fiber. The above is the composition of two specimens. The resin or *Gambogic Acid* of Johnston, is procured by forming an ethereal tincture of the pure gum-resin, and evaporating to dryness. It is brittle, in thin layers, of a deep orange color, in thicker masses of a cherry-red tint. It is insoluble in water but soluble in alcohol, and still more so in ether. Its formula is $C_{40}H_{23}O_8$.—*P.* Pereira gives the following as the tests for distinguishing Gamboge: "Gamboge emulsion becomes transparent and deep red on the addition of potassa, forming *gambogiate of potassa.* Digested in alcohol or ether, Gamboge yields orange-red tinctures (*solutions of Gambogic Acid*). The ethereal tincture dropped on water yields, on the evaporation of the ether, a thin, bright yellow, opaque film or scum (*Gambogic Acid*), soluble in caustic potassa. The alcoholic tincture dropped into water yields a bright, opaque, yellow emulsion, which becomes clear, deep red, and transparent, on the addition of caustic potassa. The gambogiate of potassa (obtained by any of the above processes) gives, if the alkali be not in excess, with acids, a yellow precipitate (*Gambogic Acid*); with acetate of lead, a yellow precipitate (*gambogiate of lead*); with sulphate of copper, brown (*gambogiate of copper*); and with the salts of iron, dark brown (*gambogiate of iron*)." Gambogic Acid imparts a perceptible yellow hue to ten thousand times its weight of spirit or water.—*C.*

Lump or *Cake Gamboge* occurs in masses of several pounds weight; it differs from the best Pipe Gamboge in containing starch, and fragments of wood, twigs, and air-cells. Other varieties are occasionally seen, but they are of inferior quality, and may be known by the foreign matters contained in them, the coarseness of their fracture, the dark blemishes which they frequently present, and by the tincture of iodine producing a green color when added to the cooled decoction, indicating the presence of starch. Ether and water when used alternately, dissolve the whole of pure Gamboge.

Properties and Uses.—In large doses, Gamboge is a powerful irritant, causing gastro-enteritis, and death; it is said to produce diffuse inflammation of the cellular tissue, when applied beneath the skin. On account of its severity of action, and its liability to cause serious symptoms, it is seldom employed singly, as a purgative; yet when combined with other cathartics it forms a safe and excellent physic. It may, however, be safely administered alone in moderate doses, by reducing it to a state of fine division with other comparatively inert powders, as sulphate, or bitartrate of potassa. It thus operates effectually as a hydragogue, without occasioning much tormina or constitutional exhaustion. In medicinal doses, it is a drastic, hydragogue cathartic, causing nausea, griping, and copious watery stools, on which account it is often used in dropsy, in combination with squills, cream of tartar, etc. It has also been used for the expulsion of tapeworm, in torpor of the bowels, dysmenorrhea, etc. Two grains of sulphate of quinia combined with one grain and one-fourth of Gamboge, and administered three times a day, have been highly recommended in cases of long-continued constitutional debility, with constipation. United with an alkali, it acts upon the kidneys, and proves diuretic.

Its use is contra-indicated in gastritis, enteritis, during pregnancy, menorrhagia, hemorrhoids, in excited, irritable, or diseased uterus, and where there is irritation or disease of the urinary organs. When taken in large doses, or when it acts with severity, the best remedy to counteract its dangerous effects, is a solution of some alkali, as pearl-ash water, to be followed by general treatment if inflammatory symptoms be present. Dose, in pill, powder, or alkaline solution, from one to fifteen grains; the larger doses given in small quantities, and repeated at short intervals until it operates.

Off. Prep.—Pilulæ Aloes Compositæ; Pilulæ Gambogiæ Compositæ; Pilulæ Podophyllini Compositæ.

GAULTHERIA PROCUMBENS.

Wintergreen.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This plant is known in various sections of country under different names, as *Mountain Tea*, *Deerberry*, *Partridgeberry*, *Checkerberry*, *Teaberry*, *Boxberry*, etc. It is a native, suffruticose plant, with a woody, horizontal *root* or *rhizoma*, often one-fourth of an inch in thickness. The *stems* are several, ascending about three inches from the rhizoma, round, and downy. The *leaves* are alternate, evergreen, scattered, near the extremities of the branches, coriaceous, shining, oval or obovate, acute at both ends, revolute at the edge, and furnished with a few small serratures, each terminating in a bristle. The *flowers* are few, drooping, axillary, white, on round downy stalks. *Bracts* two, concave, cordate. *Calyx* white, cleft into five roundish acute segments. *Corolla* urceolate, five-angled, contracted at the mouth; the limb divided into five short, reflexed segments. *Stamens* ten, rose-colored; *filaments* white, hairy, bent toward the corolla; *anthers* oblong, orange-colored, ending in two double horns, bursting outwardly for their whole length above the filaments; *pollen* white. *Ovary* roundish, depressed, five-angled, resting on a reddish, ten-toothed, glandular disk; *style* erect, straight; *stigma* simple. *Fruit* a small, five-celled, many seeded capsule, invested with the calyx, which becomes large, round, and fleshy, having the appearance of a bright scarlet berry.—*L.*

History.—This plant is a native of the United States, growing from Maine to Florida, and westward to Pennsylvania and Kentucky, in cool damp woods, sandy soils, and on mountains, flowering from June to October. It does not grow in alluvial soil, nor in limestone countries. The leaves are officinal, yet the whole plant may be used; the leaves have a peculiar fragrance and an agreeable, characteristic flavor, with a slight astringency; the berries possess a similar flavor with sweetness, and are eaten by many individuals: some wild animals, as deer, partridges, etc., use it for food. The leaves contain tannic acid; and an odorous volatile oil, which may be obtained in the same manner as oil of peppermint. The specific gravity of the oil is 1.173 at 50° F., it is colorless at first, but subsequently becomes more or less of a pinkish color, has a hot and aromatic taste, possesses acid properties, and is soluble in alcohol or ether. Water by infusion, and alcohol, extract the virtues of the plant.

Properties and Uses.—Wintergreen possesses stimulant, aromatic, and astringent properties. It is used in infusion as an astringent in chronic mucous discharges, as a diuretic in dysury, as an emmenagogue, as a stimulant in cases of debility, and is said to augment the flow from the lactiferous vessels of nursing women, but this is doubtful. The volatile oil, or its tincture is used to render syrups and other preparations more agreeable. The oil allays the pain of carious teeth, and large doses of it administered internally have caused death by producing inflammation of the stomach; the essence of Wintergreen is a carminative, and is sometimes used in the flatulent colic of infants. An infusion of the leaves or whole plant, may be drank freely.

The *Gaultheria Hispidula*, or Cancer Wintergreen, is supposed to be efficacious in removing the carcinomatous taint from the system; used also in scrofula, prolapsus uteri.—See *Oleum Gaultheriæ.*

GELSEMINUM SEMPERVIRENS.

Yellow Jessamine.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant is likewise known by the names of *Wild Jessamine*, and *Woodbine;* it is the *Bignonia Sempervirens* of Linnæus, and the *Gelseminum Nitidum* of Michaux and Pursh. It has a twining, smooth, glabrous *stem*, with opposite, perennial, lanceolate, entire *leaves*, which are dark-green above, and pale beneath, and which stand on short petioles. The *flowers* are yellow, having an agreeable, but rather narcotic odor, and stand on axillary peduncles. The *calyx* is very small, with five sepals; the *corolla* is funnel-form, with a spreading border, and five lobes nearly equal. *Stamens* five; *pistils* two. *Capsule* two-celled, compressed, flat, two-partible. *Seeds* flat, and attached to the margins of the valves.

History.—This plant was brought into notice, as far as we can learn, in the following manner: A planter of Mississippi, whose name we have forgotten, while laboring under a severe attack of bilious fever, which resisted all the usual remedies, sent a servant into his garden to procure a certain medicinal root, and prepare an infusion of it for him to drink. The servant, by mistake, collected another root, and gave an infusion of it to his master, who, shortly after swallowing some of it, was seized with a complete loss of muscular power, unable to move a limb, or even raise his eyelids, although he could hear, and was cognizant of circumstances transpiring around him. His friends greatly alarmed, collected around him, watching the result with much anxiety, and expecting every minute to see him breathe his last. After some hours, he gradually recovered himself, and was astonished to find that his fever had left him. Ascertaining from his servant what plant it was the root of which acted in this manner, he collected some of it, and employed it successfully on his own plantation, as well as among his neighbors. The success of this article finally reached the ears of some physician, who prepared from it a nostrum called the "Electrical Febrifuge," which was disguised with the essence of wintergreen. The plant was the Yellow Jessamine, and a knowledge of its remarkable effects was not communicated to the profession until recently.

The Yellow Jessamine abounds throughout the Southern States, growing luxuriantly, and climbing from tree to tree, forming an agreeable shade. On account of its fine yellow flowers, and the rich perfume which they impart to the surrounding atmosphere, as well as the shade it affords, it is extensively cultivated in the gardens of the South as an ornamental vine. The flowers appear from March to May. The root is the officinal part, and yields its virtues to water or alcohol. It is several feet in length, with scattered fibers, and is from two to three lines in diameter to nearly two inches. The internal part of the root is woody, and of a light yellowish color; the external part, or bark, in which the medicinal virtues are said principally to reside, is of a light snuff-color, and from half a line to three lines in thickness. The root of this plant has been said to contain a resin which is poisonous in very small doses, and a tincture, made by digesting it in undiluted alcohol, is stated to have proved fatal. This statement is denied, and upon good grounds, for were it true, death would necessarily follow the use of the tincture made with undiluted alcohol, in consequence of the presence of this resin, which would still be taken up by the alcohol in a proportion corresponding to the alcoholic strength of the solvent. Again, it has been asserted, that the deaths which have occurred where this article was used, were owing, not to the Gelseminum, bût to the presence of another very poisonous root, somewhat resembling it, which was carelessly or ignorantly collected and mixed with it. Others again, state that they have given large doses without any serious consequences, and in one case, six fluidrachms of the tincture were swallowed by a lad of twenty-years of age, without any permanent injury. Notwithstanding these statements, death has followed the employment of what was supposed to be the tincture of Gelseminum, in a few instances, and further investigations are required to determine its probable cause, and whether this agent will produce any fatal results in large medicinal doses. Yellow Jessamine may be administered in decoction, infusion, or tincture. It is reputed incompatible with no known substance, but this remains to be satisfactorily determined.

Dr. Hiram H. Hill, formerly of the firm of F. D. Hill & Co., of Cincinnati, has collected many hundred pounds of the Gelseminum root in the South. I am indebted to him for the following statement of it: "The length of the Gelseminum root, in clay soil, is from three to ten feet, and on the Magnolia ridges, and along small streams, I have traced some roots to the extent of thirty feet, although the average length is about fifteen. Like the roots of many other vines, it is branching, with scattered fibers, and runs horizontally near the surface of the ground, sometimes merely under the leaves, for several feet. When first pulled up it is very yellow, and has a peculiar odor like that of the tincture, with a bitter, rather pleasant taste to most persons, at least people were constantly tasting or chewing it, while I was collecting it. The vine is of a green color, and always runs to the top of the tree or bush on which it fastens, then branches out, covering the topmost branches with its thick foliage. I have seen it on trees that were fifty feet in height, and the size of the vine was the same near the top as at the ground; its general length is from twenty to thirty feet. The bark of the vine is full of a silk-like fiber, which is not found in other vines that I have seen. On old vines, the leaves are about one and a half inches in length, of a dark-green color, lance-shaped, and on short footstalks; on young vines or shoots they are longer and are four or five inches apart, while on the old ones they are very close and always opposite. The flowers are funnel-shaped and yellow. The vine, the root of which is sometimes gathered by mistake for the Gelseminum, resembles it very much in appearance, though it is of a lighter color, and the outer bark is covered with white specks or marks somewhat similar to those on young cherry or peach limbs, and the lower parts of the old vines become rough and have small tendrils that fasten upon the bark of trees, and which are never seen on the Gelseminum. The bark of the vine is also more brittle, and the leaves are always on long footstalks which are opposite, at the end of which are two opposite leaves, almost exactly resembling the leaf of the Aristolochia Serpentaria. The root is almost white, very tough, straight, and about the same length of the medicinal root, and has a slightly bitter, disagreeable, nauseating taste. I never saw any of the flowers, though they are said to resemble the others in shape, but are snowy-white, with a slight, unpleasant odor. The vine is called *White Poison Vine*, and *White Jessamine*."

Mr. Henry Kollock found the root of Gelseminum to contain a considerable quantity of albumen, gallic acid, starch, gum, pectic acid, a bitter, dark-green, fatty resin, insoluble in water, slightly so in alcohol; fixed oil, dry, acrid resin, yellow coloring matter, a heavy volatile oil, extractive matter, a bitter crystalline substance, probably an alkaloid, *gelseminia*, salts of potassa, lime, magnesia, iron, and silica. Neither the acrid resin, the gelseminia, nor the volatile oil were tested as to their medicinal powers.—*Am. Jour. Pharm., vol. XXVII., p.* 197.

Properties and Uses.—Gelseminum is, undoubtedly, an unrivaled febrifuge, and which appears to be dependent upon its relaxing and antispasmodic properties. Whether it is a narcotic is not yet satisfactorily established. It has recently been employed in the form of tincture by many respectable physicians, who speak highly of it in all fevers except the congestive form, in which its use is considered injurious. It has also proved efficacious in nervous and bilious headache, colds, pneumonia, hemorrhages, leucorrhea, chorea, ague-cake, and several other diseases, though it is in fevers especially in which its efficacy has been mostly observed. It is said by some to be the only agent ever yet discovered capable of subduing, in from two to twenty hours, and without the least possible injury to the patient, the most formidable and most complicated as well as the most simple fevers incident to our country and climate, quieting all nervous irritability and excitement, equalizing the circulation, promoting perspiration, and rectifying the various secretions, without causing nausea, vomiting or purging, and is also adapted to any stage of the disease. It may follow any preceding treatment with safety. Its effects are clouded vision, double-sightedness, or even complete prostration, and inability to open the eyes, and which gradually pass off in a few hours, leaving the patient refreshed, and completely restored; and as soon as the heaviness or partial closing of the eyes is induced, no more of the remedy is necessary, although these effects should even follow the first dose. If carried to such an extent that the patient can not open his eyes, the relaxation may be too great for the system to recover from, hence its use should cease as soon as the symptoms above-named have been produced.

The tincture is the form in which it is employed; the dose is from ten to fifty drops, in a wineglass half-full of water, to be repeated every two hours; the second dose, in the majority of cases, usually effecting the cure. From two to ten grains of quinia, according to the severity and character of the disease, should accompany each dose, or it is said the system will again relapse into the febrile state, in a few hours, for want of tonicity following the relaxation produced by the remedy. The original discoverers of the use of the article say, however, that the quinia is not actually necessary, but that its addition renders the cure more prompt, and, by its combination, its usually unpleasant effects, as determination to the head, etc., are completely obviated. When the fever does not yield in six hours, a mild purgative may be administered, or podophyllin in small doses may be added to the medicine; if diarrhea be present, add an opiate to it.

In the treatment of typhus and typhoid fevers it should be given in smaller doses, say from three to eight drops of the tincture, with from two to four grains of sulphate of quinia, and repeated every two or three hours until the more active febrile symptoms subside; then give one or two grains of the quinia, every two hours, and eight or ten drops of the Tincture of Gelseminum, every six or eight hours. A writer observes that his experience in the treatment of fevers, with this agent, inclines him to believe that when given in doses sufficiently large to produce its full and complete constitutional effects, it impairs the tonicity of the muscular fibers of the heart (which are always weakened in those fevers), and thus retards or prolongs convalescence.

Gelseminum possesses a most perfect control over the nervous system, removing nervous irritability more completely than any other known agent. It may be used in all forms of neuralgia, nervous headache, toothache, and lockjaw or tetanus. It is recommended in this last difficulty as an agent that may be relied upon with definite certainty. In gout and rheumatism it may be advantageously added to the tinctures of guaiacum or colchicum. Combined with mild diuretic and secernent agents, nephritic and cystic irritability and leucorrhea, have readily yielded.

Upon the uterus it appears to exert an opposite influence, for while it produces complete and powerful relaxation of every other tissue, it tends to promote contraction of the uterus, causing an influence intermediate between ergot and cimicifuga, it being less energetic than the former, and more so than the latter. This property, when continued, as it is, with its relaxing effects upon every other tissue, promises to render it an important aid in parturition.

Externally, the tincture will be found of service in neuralgic and rheumatic pains. Its internal administration is contra-indicated in congestive fever, in cases where there is great muscular or nervous prostration with relaxation, and when there exists a determination to the brain or other important viscus. Like all newly-discovered agents which possess active and efficacious influences, this has probably been too highly lauded, yet if one-half of the virtues reported to exist in this plant are true, it is certainly deserving the close investigation of all classes of physicians.

Off. Prep.—Tinctura Gelsemini.

GENTIANA LUTEA.

Gentian.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant has a long, thick, cylindrical, wrinkled, ringed, forked, perennial root, brown externally, and yellow within. The *stem* is three or four feet high, hollow, stout, erect. The *radical leaves* are ovate-oblong, five-nerved, two or three inches broad; those on the stem sessile, ovate, acute; those next the flowers cordate, amplexicaul, concave; all a pale, bright-green. The *flowers* are large, bright-yellow, in many-flowered whorls, peduncled; *calyx* monophyllous, of a papery texture and semitransparent, three or four-cleft, with short, lanceolate, unequal segments; *corolla* rotate, with a very short tube and five or six green glands. at the base, five or six parted, with oblong, acute, narrow, veiny lobes; *stamens* five or six, not so long as the corolla; *anthers* subulate, somewhat united, becoming distinct; *ovary* conical; *stigmas* sessile, revolute; *capsule* stalked, oblong, two-valved, one-celled; *seeds* many, flattened, with thin, brownish edges.—*L.*

History.—This plant is common to the central and southern parts of Europe, especially the Pyrenees, Alps, etc., being found from 3,000 to 5,000 feet above the level of the sea. Its root affords the medicinal portion, and is brought to this market from Havre, Marseilles, etc. It is met with in pieces of various sizes, seldom above an inch in thickness, split lengthwise if large, marked with annular wrinkles and longitudinal furrows; sometimes it is met with in transversely-cut pieces. It consists of an external reddish-yellow layer, separated by a dark reddish-brown line, and a grayish-yellow, or reddish-spongy center. It has a feeble, aromatic odor, and a taste at first faintly-sweetish, and then purely, intensely, and permanently bitter. It imparts its virtues readily to cold or hot water, alcohol, wine, spirit, or sulphuric ether. A small portion of a butyraceous oil may be procured by distilling Gentian with water. A liquor in some parts of Switzerland is much prized as a stomachic; it is made by macerating the root in cold water, adding yeast, and distilling after vinous fermentation has occurred. It contains, according to Henry and Caventou, a volatile, odorous matter, gentianin, volatile oil, yellow coloring matter, green fixed oil, gum, uncrystallizable sugar, matter identical with bird lime or free organic acid, and woody fiber.—*P.*

The *gentianin* of Henry and Caventou has since been ascertained to possess no taste or medicinal virtues, and has been named *gentisin*, or *gentisic acid.* The substance resembling *birdlime* has also been shown by Leconte to be a compound of caoutchouc, wax, and oil. The bitter principle of the root, has likewise and more properly been named *gentianin;* it may be obtained by exhausting the coarsely powdered root with alcohol, distilling off the alcohol, and dissolving the residuum in water. Filter this solution, ferment it to remove the sugar, and add neutral acetate of lead; separate the liquid from the precipitate by filtration, and then add to it basic acetate of lead, and a very small quantity of ammonia, to throw down the oxide of lead and vegetable matter together; if too much ammonia be employed, it will separate the metallic oxide from the organic matter. The yellow precipitate thus had, must be washed in small quantities of water, as in a large quantity the metallic and vegetable combination will be decomposed. This accomplished, the precipitate is to be dissolved in a large quantity of water, the lead precipitated by sulphureted hydrogen, the solution filtered and evaporated to dryness at a moderate temperature. The substance which remains is dissolved in alcohol sp. gr. 0.820, filtered, and again evaporated. The Gentianin thus procured is an amorphous, brownish-yellow, bitter substance soluble in water, less so in alcohol, sp. gr. 0.835, and not at all in anhydrous alcohol. It contains no azote, has an acid reaction on litmus, and when heated melts, swells up, and burns without any residue.—*Dulk. J. P. in Jour. de Pharm.*

Properties and Uses.—A powerful tonic, improves the appetite, strengthens digestion, gives more force to the circulation, and slightly elevates the heat of the body. Used in cases of debility and exhaustion, and in all cases where a tonic is required, as dyspepsia, gout, amenorrhea, hysteria, scrofula, intermittents, diarrhea, worms, etc. Dose of the powder from ten to thirty grains; of the extract, from one to ten grains; of infusion, one or two fluidounces; of tincture, one or two fluidrachms. When taken in large doses, it is apt to oppress the stomach, irritate the bowels, and even produce nausea and vomiting. Its administration is contra-indicated where gastric irritability is present.

Dr. Kuchenmeister believes that impure and uncrystallized Gentianin is the most valuable substitute for quinia, acting as rapidly and as efficaciously on the spleen, in doses of from fifteen to thirty grains twice a day.

GENTIANA CATESBEI, *Blue*, or *American Gentian*, has a perennial, branching, somewhat fleshy *root*, with a simple, erect, rough *stem*, eight or ten inches in height. The *leaves* are opposite, ovate or lanceolate, slightly three-veined, acute, rough on the margin. *Flowers* large, blue, crowded, subsessile, axillary, and terminal. *Calyx* divided into four or five linear-lanceolate segments, which are longer than the tube. *Corolla* large, blue, ventricose, plaited; its border divided into ten segments, of which the outer five are roundish and more or less acute, and the inner five bifid and imbricate. *Stamens* five, with dilated filaments and sagittate anthers. *Ovary* oblong-lanceolate, compressed, supported by a sort of pedicel. *Style* none; *stigmas* two, oblong, reflexed. *Capsule* oblong, acuminate, one-celled and two-valved.—*L.*—*B.* It grows in the grassy swamps and meadows of North and South Carolina, flowering from September to December. The root is little inferior to the foreign Gentian, and may be used as a substitute for it in all cases, in the same doses and preparations. Alcohol and boiling water extract its virtues. Probably the *Gentiana Saponaria*, or Soapwort Gentian, the *Gentiana Pneumonanthe*, or Marsh Gentian, and the *Gentiana Crinita*, or Blue Fringed Gentian, possess analogous medicinal virtues.

GENTIANA QUINQUEFLORA, Five-flowered Gentian, sometimes called Gall-weed, on account of its intense bitterness, has been found of much service in headache, liver affections, jaundice, etc. It has a branching, smooth, four-angled *stem*, half-clasping, ovate-lanceolate, acute, three to five veined, smooth *leaves*, small terminal and axillary *flowers*, about in fives, and on pedicels half an inch long. *Corolla* tubular, campanulate, in five lanceolate, setaceously acuminate segments, pale-blue, four times as long as the subulate sepals.—*L.* The plant grows in woods and pastures, flowering in September and October, is found from Vermont to Pennsylvania, and a variety of it is common through the Western States. This is certainly a valuable tonic and cholagogue, and deserves further investigation.

Off. Prep.—Extractum Gentianæ; Extractum Gentianæ Fluidum; Vinum Symphyti Compositum.

GENTIANA OCHROLEUCA.

Ochroleucous Gentian.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT AND TOPS.

Description.—This plant is likewise known by the names of *Marsh Gentian*, *Yellowish-white Gentian*, *Straw-colored Gentian*, *Sampson Snakeroot*, etc.; it has a stout, ascending *stem*, mostly smooth, and from one to two inches in height. The *leaves* are from two to four inches long, by three quarters of an inch to an inch and a half wide, obovate-oblong, sessile or amplexicaul, margins slightly scabrous, and narrowed at the base; the lowest are broadly ovate and obtuse, the uppermost somewhat lanceolate. The *flowers* are straw-colored, two inches long by three-quarters of an inch thick, and disposed in a dense terminal cyme, and often also in axillary cymes. The *calyx* is five-cleft, the *lobes* unequal, linear, longer than the tube, and shorter than the corolla. The *corolla* is clavate, connivent or slightly expanding at top, ochroleucous or straw-color, with green veins and lilac-purple stripes internally; its *lobes* ovate, obtuse; the *folds* entire, acute, short. *Anthers* separate. *Capsule* or *pod* included in the persistent corolla. Seeds entirely wingless.—*W.*—*G.*

History.—This plant is found growing in dry grounds, especially through the middle and low country of the Southern States, flowering in September and October. Said likewise to inhabit Canada and the Western States, but this must be rare. The root is the officinal part, and the tops are also often employed. They are bitter to the taste, and probably possess the medicinal properties, in a greater or less degree, of the preceding plants of the same family. Alcohol or boiling water extracts their virtues. None of the American Gentians have been satisfactorily analyzed.

Properties and Uses.—Bitter tonic, anthelmintic, and astringent. Used in dyspepsia, intermittents, dysentery, and all diseases of periodicity. To two ounces of the tops and roots, pour on one and a half pints of boiling water, and when nearly cold, add half a pint of brandy. Dose, from half a fluidounce to four fluidounces, every half hour, gradually increased as the stomach can bear it, at the same time lengthening the intervals between the doses. Also used for bites of snakes, and in typhus fevers, pneumonia, etc.

GERANIIN.

Geraniin.

THE CONCENTRATED EXTRACT OF GERANIUM MACULATUM.

Preparation.—Geraniin is obtained by making a saturated tincture of the root of Geranium Maculatum, filtering, distilling off a part of the alcohol, adding water to the rest, and evaporating to dryness. The operation is similar to that for preparing podophyllin. Many manufacturers prefer making it by evaporating an aqueous decoction of the root to dryness, and evaporating.

History.—Geraniin is especially an American remedy. It was first prepared by Mr. Wm. S. Merrell, of Cincinnati. It is a black substance, forming a dark-brown, glistening powder, of a faint odor, somewhat like that of molasses, and an astringent, acidulous taste, leaving a flavor in the mouth somewhat resembling that of good green tea. Cold water added to it does not appear to dissolve any, but when filtered gives an acid reaction, turning blue litmus paper red, and on the addition of sulphate of iron becomes a deep bluish-black, forming a good writing ink. Ammonia added to water in which Geraniin is placed, partially dissolves it; liquor potassa added, completely dissolves it, forming a black solution; muriatic acid added, does not affect its solution at all. It is very little soluble in alcohol, imparting to it a light reddish-yellow tinge, and on the addition of ammonia, more of the Geraniin is dissolved, and the rest is held in a state of suspension in the liquid. It is insoluble in ether, chloroform, and oil of turpentine; acetic acid added to ether partially dissolves it, causing a reddish solution; ammonia added, does not render it any further soluble, and the clear ether floats on the top. Its composition is not yet determined, though it undoubtedly contains an abundance of tannic or gallic acids.

Properties and Uses.—Geraniin is a powerful astringent, and unlike tannic acid in its action, does not cause a dryness of the mucous surfaces with which it comes in contact, but produces its therapeutical influences upon them with the continuance of their natural moisture. On this account, and in connection with its not unpleasant taste, it will, undoubtedly, in a short time, supersede the use of tannic acid in most of the diseases in which this acid is employed. Geraniin may be employed in all instances where astringents are indicated. It has been found a superior article both in the first and second stages of dysentery, diarrhea, and cholera-morbus. Equal parts of Geraniin, dioscorein, and caulophyllin, will be found a valuable mixture in diarrhea and cholera-morbus, when much pain and flatulency are present; the mixture may be given in six-grain doses to an adult, every fifteen or twenty minutes, or as often as the urgency of the case may require. Geraniin will be found efficacious in hemorrhages, hematuria, menorrhagia, leucorrhea, gleet, diabetes, etc. In colliquative diarrhea it answers an excellent purpose either alone, or in combination with quinia. Externally, it may be applied to ulcers, and combined with alum and gum Arabic, it forms an excellent application to bleeding wounds and in epistaxis. All practitioners who have used this article in their practice, speak in the highest terms of its efficacy as an astringent. Dose of Geraniin, from one to five grains or more, repeated as required; it may be given in syrup, molasses, gruel, water, or Port wine.

GERANIUM MACULATUM.

Geranium.

Nat. Ord.—Geraniaceæ. *Sex. Syst.*—Monadelphia Decandria.

THE ROOT.

Description.—This plant is also known by the names of *Cranesbill*, *Spotted-geranium*, *Wild-cranesbill*, *Crowfoot*, *Alum-root*, etc. It has a perennial, horizontal, thick, rough and knobby *root*, with many small fibers. The *stems* are grayish-green, erect, round, clothed with reflexed hairs, angular, dichotomous, and a foot or two high. The *leaves* are spreading, hairy, palmate, with three, five, or seven deeply cleft lobes, two leaves at each fork; the *lobes* are cuneiform and entire at the base, incisely serrate above. The radical-leaves are on long petioles, erect and terete; the leaves at the top are opposite and subsessile, and those at the middle of the stem are opposite, petiolate, and generally reflexed. The *stipules* are linear or lanceolate. The *flowers* are large, and generally purple, mostly in pairs, on unequal pedicels, sometimes umbelled at the ends of the peduncles. *Peduncles* long, round, hairy, tumid at base, at the forks of the stem two-flowered. The *calyx* consists of five obovate, ribbed, mucronate sepals; the outermost hairy. The *petals* are five, obovate, entire, light purple, marked with green at the base. The *stamens* are ten, erect or curving outward, alternately longer, furnished at the base with glands, and terminated by oblong, convex, deciduous, purple anthers. *Ovary* ovate; *style* straight, as long as the stamens; *stigmas* five, at first erect, afterward recurved. *Capsules* five, together, each one-seeded.—*L.*— *W.*

History.—Geranium is a native of this country, growing in nearly all parts of it, in low grounds, open woods, etc., flowering from April to June. There are several varieties of this species which are probably equivalent in medicinal virtues to the G. maculatum. The root is the officinal part, and should be gathered in the months of October and November. The dried root is in fragments varying from one to four inches in length, and from three to six lines in diameter, slightly compressed, rough, knotty, rugose, with small fibers attached; externally its color is dark-brown, internally dingy-white, and frequently with a reddish tint; its fracture is short. It has a feeble odor, an astringent, slightly bitterish taste, and affords a gray powder. Its virtues are yielded to water or alcohol. It was analyzed by Dr. Staples, who found it to contain a large quantity of gallic acid, tannic acid, mucilage, amidin, red coloring matter, principally in the external covering of the root, a small amount of resin, and a crystallizable vegetable substance.—*Jour. Phil. Col. Pharm., Vol. I., p.* 171.

Properties and Uses.—A *powerful astringent.* Used in the second stage of dysentery, diarrhea, and cholera infantum in infusion with milk. Both internally and externally it may be used wherever astringents are indicated, in hemorrhages, indolent ulcers, aphthous sore mouth, ophthalmia, leucorrhea, gleet, hematuria, menorrhagia, diabetes, and all excessive chronic mucous discharges; also, to cure mercurial salivation. Relaxation of the uvula may be benefited by gargling with a decoction of the root, as well as aphthous ulceration of the mouth and throat. From its freedom from any nauseous or unpleasant qualities, it is well adapted to infants and persons with fastidious stomachs. In cases of bleeding piles, a strong decoction of the root may be injected into the rectum, and which should be retained as long as possible. Piles are said to be cured by adding of the root in fine powder, two ounces, to tobacco ointment seven ounces, and apply to the parts, three or four times a day. Troublesome epistaxis, bleeding from wounds or small vessels, and from the extraction of teeth, may be checked effectually be applying the powder to the bleeding orifice, and if possible, covering with a compress of cotton. With Aletris Farinosa in decoction, and taken internally, it has proved of superior efficacy in diabetes and in Bright's disease of the kidney. A decoction of two parts of Geranium and one of Sanguinaria forms an excellent injection for gleet and leucorrhea. Dose of the powder, from twenty to thirty grains; of the decoction, from one to two fluidounces. The *Geranium Robertianum*, or Herb Robert, grows wild both in Europe and the United States, but is rare in this country; and Pursh states that the American plant is destitute of the heavy smell by which the European is so well known, though the two agree in all other respects. It has a tapering root, with several round, leafy, branched, reddish, brittle, succulent, and diffuse *stems*, hairy, chiefly on one side. The *leaves* are opposite, shining, petiolate, more or less hairy, three to five cleft to the base, the segments pinnatifid, and the pinnæ incisely-toothed. The *flowers* are small, in pairs, pale-purple, occasionally white, and situated on lateral and terminal peduncles. *Calyx* brownish, hairy, with ten angles when closed. *Petals* obovate, entire. *Sepals* mucronate-awned, half as long as the entire petals. *Stamens* awl-shaped, smooth. *Capsules* small, obovate, downy, carinate, curiously-marked at the outer edge with elevated interbranching wrinkles. *Seeds* smooth and even.—*L.*—*W.* The plant flowers from May to September, and has a strong unpleasant smell. The herb has a disagreeable, bitterish, astringent taste, and imparts its virtues to boiling water. It has been used internally in intermittent fever, consumption, hemorrhages, nephritic complaints, jaundice, etc.; and has been employed as a gargle in affections of the throat, and applied externally as a resolvent to swollen breasts and other tumors.

GERARDIA PEDICULARIA.

Bushy Gerardia.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE HERB.

Description.—This is the *Dasystoma Pedicularia* of Bentham; it is a perennial plant, known also by the names of *Feverweed*, *Lousewort*, *American Foxglove*, etc. Its *stem* is tall and bushy, with a scattered, woolly pubescence, two or three feet in height, and brachiate-panicled. The *leaves* are numerous, opposite, ovate-lanceolate or oblong, pinnatifid, the *segments* doubly cut-dentate. The *flowers* are large, yellow, axillary, trumpet-shaped, opposite, and pediceled; *pedicels* longer than the calyx. The *calyx* is five cleft, cut-dentate, segments as long as the hairy tube. The *corolla* is yellow, an inch or more in length, subcampanulate, unequally five-lobed, *segments* mostly rounded, spreading, leaf-like, and woolly inside. *Capsule* two-celled, dehiscent at the top.—*L.*—*W.*

History.—This is a most elegant plant found growing in dry copses, pine ridges, and barren woods and mountains from Canada to Georgia and Kentucky, and flowering in August and September. The whole plant is used. Water or spirit extracts its virtues. It has not been analyzed. There are several varieties of the species, which probably possess analogous virtues.

Properties and Uses.—Diaphoretic, antiseptic, and sedative. Used principally in febrile and inflammatory diseases; a warm infusion produces a free and copious perspiration in a short time. Dose of the infusion, from one to three fluidounces.

Off. Prep.—Infusum Gerardiæ.

GEUM RIVALE.

Water Avens.

GEUM VIRGINIANUM.

White Avens.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE ROOT.

Description.—Geum Rivale, likewise known as *Purple Avens*, is a perennial, hairy, deep-green herb, with a creeping, blackish, somewhat woody *root*, running deep into the ground, with numerous fibers. The *stems* are a foot or two high, nearly simple, erect, slightly paniculate at top. The *radical leaves* nearly lyrate, and uninterruptedly pinnate, with large terminal leaflets on long hairy petioles, rounded, lobed and crenate-dentate, and from four to six inches long. The *cauline leaves* are few, subsessile, from one to three inches long, and divided into three serrate, pointed lobes; *stipules* ovate, acute, cut, purplish. The *flowers* are few, subglobose, nodding, yellowish-purple, and stand on axillary and terminal peduncles. The *calyx* is inferior, erect, purplish-brown, with ten lanceolate pointed segments, with five alternately smaller than the others. The *petals* are five, as long as the erect calyx segments, broad-obcordate, clawed, purplish-yellow, veined. Seeds oval, bearded, hooked at the end.—*L.*—*W.*—*G.* This species is common to Europe and this country, and is found growing in woods, wet meadows, and along streams, especially in the Northern and Middle States, and flowering in June and July. The American species differs from the European in having its petals more orbicular on their free margin, the flowers of less size, and its leaves with deeper incisions. The fresh root is aromatic.

GEUM VIRGINIANUM, also known as *Throat-root*, *Chocolate-root*, etc., is also perennial, with a small, brownish, horizontal, crooked *root*. The *stem* is simple or branched, smoothish above, pubescent below, and two or three feet high. The *radical leaves* are pinnate, lyrate or simple and rounded, with appendaged petioles from six to eight inches long; the *cauline leaves* three or five lobed, softly pubescent; *all* unequally and incisely dentate. The *flowers* are rather small, white, erect, on long diverging peduncles; *calyx* five-cleft, with five smaller and exterior, alternate bracteoles; *petals* five, about the length of the calyx; *stamens* numerous; *filaments* slender; *anthers* yellowish, round. *Styles* many, persistent, mostly jointed, geniculate and bearded, hooked after the upper oint falls away. *Fruit*, achenia, aggregated on a dry receptacle, and caudate with the style.—*W.*—*G.* This plant is found in hedges and thickets, and in moist places, in most parts of the United States, flowering from June to August.

History.—These plants, with some other varieties, have long been used in domestic practice. The whole herb contains medicinal properties, but the officinal and most efficient portion is the root. The dried root of the G. Rivale is scaly, jointed, tapering, hard, brittle, easily pulverized, of a reddish or purplish color, and inodorous; that of the G. Virginianum is brown, crooked, tuberculated, and brittle; both are white internally, and of a bitterish, astringent taste. Boiling water or alcohol extracts their virtues, the solution becoming reddish. They have not been analyzed, but probably contain tannic acid, bitter-extractive, gum, resin, etc. A weak decoction of the root of G. Rivale is sometimes used by invalids as a substitute for tea and coffee.

Properties and Uses.—Tonic and astringent. Used in numerous diseases, as passive and chronic hemorrhages, chronic diarrhea and dysentery, leucorrhea, dyspepsia, phthisis, congestions of the abdominal viscera, intermittents, aphthous ulcerations, etc. Dose of the powder, from twenty to thirty grains; of the decoction, from one to two fluidounces, three or four times a day.

The *Geum Urbanum*, or European Avens, possesses similar properties.

GILLENIA TRIFOLIATA.

Indian Physic.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Pentagynia.

THE BARK OF THE ROOT.

Description.—Indian Physic is an indigenous perennial herb, with an irregular, brownish, somewhat tuberous caudex, from which radiates many long, knotted, delicate fibers. The *stems* are several from the same root, are about two or three feet in height, erect, slender, flexuose, smooth, branched above, and of a reddish or brownish color. The *leaves* are alternate, trifoliate, subsessile, furnished with small linear-lanceolate, slightly-toothed stipules at the base; the *leaflets* are lanceolate, acuminate, sharply and unequally toothed, the upper ones often single, the lower broader at the end, but acuminately terminated. The flowers are white, with a reddish tinge, in terminal, loose panicles, few in number, scattered, on long peduncles, and occasionally furnished with minute lanceolate bracts. *Calyx* subcampanulate or tubular, terminating in five sharp reflexed teeth. *Petals* five, the two upper ones separated from the three lower, white with a reddish tinge on the edge, lanceolate, unguiculate, contracted and approximated at base, and three times as long as the calyx. *Stamens* are about twenty, in a double series within the calyx, with short filaments, and small and yellow anthers. The *styles* are five, with obtuse stigmas. *Capsules* five, connate at base, oblong, acuminate, diverging, gibbous without, sharp edged within, two-valved, one-celled, one or two-seeded; seeds oblong, brown, bitter.—*L.*—*B.*

History.—This plant is found growing from Canada to Florida, in rich woods, light gravelly soils, and in moist and shady situations; it is more common in the Atlantic States than the Western. It blossoms from May to August. The root is the officinal part, and must be collected in autumn. As met with in the shops it is a dry, tuberculated root, three or four lines in diameter, corrugated lengthwise, and of a reddish-brown color externally; it is composed of a light colored, ligneous internal substance, and an easily removed, dense, friable, brownish bark, which is readily reduced to a powder having a similar color. It is nearly odorless, and has a nauseous, amarous taste, and yields its properties to alcohol or water at 212° F. The bark is the active portion, the internal woody substance being nearly inert. According to Mr. Shreeve, it contains starch, gum, resin, wax, a fatty matter, a red-coloring substance, a volatile coloring matter, and a peculiar principle soluble in alcohol and dilute acids, but insoluble in water or ether.—*Am. Jour. Pharm., Vol. I., p.* 28. Mr. W. B. Stanhope procured *Gillenin* as follows: Eight ounces of the coarsely powdered bark of the root of G. Trifoliata was exhausted by percolation with absolute alcohol. The red tincture thus obtained was evaporated to the consistence of an extract; this was dissolved in cold water, the solution filtered, evaporated to a syrupy consistence, spread on glass and dried. Impure Gillenin was thus obtained of a reddish-brown color. This was purified by dissolving it in water acidulated with sulphuric acid, allowing it to macerate for ten days; then filtered, saturated with magnesia, evaporated and dried. The Gillenin was now taken up by alcohol, the solution filtered, and set aside to evaporate spontaneously. The Gillenin thus obtained was whitish, permanent in the air, slightly odorous, of a very bitter taste, soluble in water, alcohol, ether, and dilute acids, neutral, giving a fine green color with chromic acid, and a blood-red with strong nitric acid. Tannic acid produced no effect, but caustic potassa, subacetate of lead, and tartar emetic, threw down white precipitates. In doses of half a grain it produced emesis, with considerable vertigo.

The *Gillenia Stipulaceæ*, or Bowman's root, which is found on the western side of the Alleghany Mountains, growing through Ohio, Indiana, Illinois, Missouri, and southward, flowering at the same time as the above, possesses similar properties, but is more efficacious in the same doses. It may be distinguished by its drab-colored and branching stems, its greater size, its large, clasping, ovate-cordate, leafy, gashed, and serrated stipules, its lower leaves being of a reddish-brown color at the tips; the stipules are leafy, ovate, doubly incised and clasping; and the flowers are fewer, smaller, on slender peduncles, hanging in loose panicles. It is seldom met with in limestone or alluvial soils.

Properties and Uses.—The root-bark of these plants is emetic, cathartic, sudorific, expectorant, and tonic. In their action, they resemble ipecacuanha. They have been recommended in amenorrhea, rheumatism, dropsy, habitual costiveness, dyspepsia, worms, and in intermittents. As an emetic and cathartic, from twenty to thirty-five grains is a dose, which when vomiting is required, may be repeated at intervals of twenty minutes. It may be used in all diseases where emetics are indicated, as a safe and efficacious agent. In dyspepsia, accompanied with a torpid condition of the stomach, from two to four grains form an excellent tonic. As a sudorific, six grains may be given in some cold water, and repeated at intervals of two or three hours, or it may be given in combination with a small portion of opium. Large and oft-repeated doses of the infusion cause severe vomiting and purging.

GLUE.

GELATIN NOT PERFECTLY PURE.

History.—Gelatin is found in abundance in various animal substances, especially in the skin, cartilages, tendons, membranes, and bones; it may be obtained by boiling these solid animal parts in water, straining the decoction, and evaporating it, until it has a resemblance to jelly on cooling. This is divided into thin slices of various sizes, which are allowed to dry in the open air. The gelatinous matter of the cellular tissue and membranes, is insoluble in cold water and acids, and combines with corrosive sublimate, persulphate of iron, alum, and other salts, forming insoluble compounds which do not putrefy; gelatin itself readily putrefies. The gelatin obtained from the skin when moist, combines with tannic acid, if steeped into a solution of the acid, and is converted into leather. The gelatin of the cartilages is termed *Chondrin.* That from the air-bladder of fishes forms isinglass, which is the purest variety of gelatin. (*See Isinglass.*) The common gelatin of commerce, called *Glue*, is prepared from cuttings of parchments, or the skins, ears, bones, and hoofs of animals. When pure gelatin, one part, is dissolved in one hundred parts of hot water, a jelly is formed when it cools. For a method of preparing Glue from leather, by Jno. Stenhouse, see *Am. Jour. Pharm., Vol., XHX. p.* 352.

Glue of good quality is firm and friable, not easily pulverized, of a light brown color, and translucent. On the addition of water, it becomes soft and swells up, but does not dissolve except the water be hot or boiling. When dissolved in hot water, it is much in use for uniting wood, and various other substances together, but is too impure for internal employment or for a chemical test. By the addition of nitric acid to a solution of Glue, a cement or liquid Glue is obtained, which does not require the aid of heat to render it fit for use. (*See Nitric Acid.*)

Properties and Uses.—Glue has been introduced here, in consequence of its application in pharmacy for the purpose of promoting certain useful indications. Several remedial agents of a valuable character, are unfortunately so repulsive to the palate as to produce nausea and vomiting whenever swallowed, and as in many instances it is almost impossible to dispense with them, an important object is to prepare them so that they may reach the stomach without offending the organs of taste. This has been effected by inclosing the medicine in a case or cover of Glue, forming what are called *gelatin capsules*, invented in France by M. Mothe. There are several methods at the present day for making these capsules; thus the end of an iron rod is made bulbous or egg-shaped, and is highly polished; being slightly oiled it is dipped into a hot, concentrated solution of three parts of pure gelatin, half a part of sugar, and six parts of water. A number of rods are generally used; the rods are then rotated to spread the solution evenly over the mold or bulb, and placed bulb upward on a board perforated for the purpose; when cool and dry they may be removed by giving to the capsule or bulb a pulling and gently twisting motion. These are then filled with the medicine, and the orifice closed over with more of the gelatin solution. Sometimes animal membrane or fine skin, distended with mercury, is used instead of the iron bulb. For a detailed method of preparing gelatin capsules, see *Mohr*, *Redwood*, *and Procter's Pharmacy*, and *Am. Jour. Pharm.*, *IX.*, *p.* 20. In this way capsules may be made to contain from ten to twenty grains of liquid. When received into the stomach, the gelatin is dissolved, allowing the medicine to accomplish its therapeutical influences.

A good paste is made by dissolving Cooper's best white Glue, three ounces (avoir.), refined sugar one and a half ounces, water ten fluidounces, or a sufficient quantity, together by the aid of a water-bath, and while warm apply it by means of a suitable brush to the reverse side of the labels while uncut or in sheets. After being dried and moderately pressed they are ready for cutting. Thick paper and not sized will require less water than when thin and well sized, and in all cases it should be quickly and evenly applied. It can only be used while warm. It does not penetrate the paper and disfigure labels, is very adhesive, never loosens from glass, and leaves no disagreeable impression in the mouth after being moistened with the saliva.

GLYCERINA.

Glycerin.

THE SWEET PRINCIPLE OF OILS.

Preparation.—"Digest an oil with an alkaline ley till it is converted into soap. The soap being separated, the alkaline liquid remaining is saturated with sulphuric acid, and any excess of acid is removed by carbonate of baryta. Filter and evaporate to the consistence of a syrup. Dissolve the syrup in alcohol, and filter in order to separate the alkaline sulphate. When the alcoholic solution is evaporated, the Glycerin is obtained in a state of purity."—*T.* Or it may be prepared by digesting equal parts of ground litharge (protoxide of lead), and olive oil with a little boiling water, stirring and adding water as it evaporates. When it is of the consistence of soft plaster, it is to be well washed with hot water. Decant and filter, then pass sulphureted hydrogen through the fluid, in order to throw down the lead; after which, filter, and evaporate to a syrup in a water-bath. The syrupy product is glycerin, and looks a little like mucilage of gum Arabic.

In view of the increasing demand for Glycerin in the arts and sciences, Campbell Morfitt, M. D., has offered a new process for its manufacture, which he says "combines the great and desirable advantages of economy of time, labor, and money." "One hundred pounds of oil, tallow, or pressed lard, are to be melted in a clean iron-bound barrel, by the direct application of a current of steam, and to the hot fluid add fifteen pounds of lime, previously slaked and made into a milk, with two and a half gallons of water; the vessel is now to be covered and the steaming continued for several hours, or until saponification is perfected, and which may be known by its breaking with a cracking noise, and giving a smooth, lustrous surface when scraped with the finger-nail. This process decomposes the fat, the lime uniting with its acids to form insoluble lime soap, while the Glycerin which is freed remains in solution in the water, along with the excess of lime. Having sufficiently boiled it, allow it to cool and settle, and then strain through a crash cloth. (The soap may be used for candles, etc.) Carefully concentrate the strained liquid by steam heat, pass a current of carbonic acid gas through it, which unites with the lime to form a carbonate; boil again to convert any soluble bicarbonate of lime, that may have been formed, into insoluble neutral carbonate, and allow the liquid to rest. When there is no more deposit, decant or strain off the supernatant fluid, evaporate, as before, to drive off any excess of water, and pure Glycerin remains."—*Silliman's Journal, 2d ser., XV.*, 429.

History.—Glycerin was discovered by Scheele, who called it the sweet principle of oils and fats. When perfectly pure and anhydrous, Glycerin is colorless, or yellowish, having a sweet taste and syrupy consistence, with a faint but not disagreeable odor. It combines readily with water, alcohol, or oils; dissolves many gums and resinous substances; does not crystallize, nor ferment like sugar; will not evaporate beyond a certain point, and is destroyed by boiling. It is insoluble in fatty matter, and can only be incorporated with it mechanically, to effect which, it is necessary that the fat should have a soft consistence, which may be imparted to it by combining it with oil of sweet almonds, or some other fixed oil. It is not dissolved by ether, and has the specific gravity 1.252, or 1.280 when anhydrous. It attracts moisture from the atmosphere, but is not volatile; distillation decomposes it. In the open air Glycerin burns with a blue flame. Nitric acid slowly converts it into oxalic acid; sulphuric acid into sulpho-glyceric acid, having the formula $HO\ (C_6\ H_7\ O_5\ SO_3)\ SO_3$, and which forms salts soluble in water; with phosphoric acid it forms a paired acid $2\,HO, C_6\,H_7\,O_5, PO_5$; nitric and sulphuric acids united give with it a violently exploding, and highly poisonous fluid, to which the name "pyroglycerin" has been applied. When free from iron or lead, an aqueous solution of Glycerin gives no precipitate with ferrocyanuret of potassium, or hydrosulphate of ammonia. It is a hydrated oxide of glyceryle, having the formula $C_6\,H_7\,O_5+HO=Gl\,O_5\,HO$. Glycerin mixes with acetic acid; moistens bodies without rendering them greasy, does not become rancid, and is easily charged with the aroma of volatile oils.

Glycerin dissolves the vegetable acids, the deliquescent salts, the sulphates of potassa, soda, and copper, the nitrates of potassa, and silver, the alkaline chlorides, potassa, soda, baryta, strontia, bromine, iodine, and even oxide of lead. It dissolves the salts of morphia, one-tenth of sulphate of quinia, and when triturated with these, or the salts of strychnia, veratria, brucia, and other vegetable alkaloids, forms a cerate very useful for frictions and embrocations. It also dissolves sulphuret of potassium, of lime, and of iodine, iodide of sulphur, of potassium, and of mercury, and of some chlorides. It also appears to have a preservative power upon meat. By distillation Glycerin is obtained pure and free from lead; Mr. G. F. Wilson states as his process for purifying Glycerin: "Steam, at a temperature of from 550° to 600° F., is introduced in a distillatory apparatus, containing a quantity of palm (or any oil). The fatty acids take up their equivalents of water, and the Glycerin takes up its equivalent; they then distill over together. In the receiver, the condensed Glycerin, from its higher specific gravity, sinks below the fat acids. Sufficient steam must be supplied, and the temperature regulated, otherwise the elements of the Glycerin do not take up their equivalent of water, and acroleine is evolved—a body of a very different character, an acrid eye-inflammatory vapor, appreciated only by those who have had the misfortune of an experimental acquaintance with it. In an ordinary apparatus the Glycerin distilled from the neutral fat is not in a sufficiently concentrated state for most purposes; it should therefore be concentrated, and, if discolored be re-distilled. It is then obtained, of sp. gr. 1.240, containing 94 per cent. of anhydrous Glycerin. It can be concentrated to sp. gr. 1.260, or to contain 98 per cent. The formula of Glycerin is $C_6\,H_7\,O_5+HO$."

Pyroglycerin, nitrate or oxide of Glycyl, *Nitro-glycerine*, or *Glonoïne*, a very dangerous article to prepare, is made from Glycerin. It is an oleaginous liquid of a clear yellow color, having a specific gravity from 1.595 to 1.600. Heated to 320° F., it is decomposed evolving red vapors; at a higher temperature it either explodes or inflames without any detonation. By placing a drop on an anvil and striking it with a hammer, it instantly detonates. When properly prepared and free from acid, it may be kept for any length of time. Sulphuric acid added to its ethereal solution, decomposes it, precipitating a large amount of sulphur. According to M. J. E. Vrij, it may be made as follows: "Free 1,543.3 grains of Glycerin as much as possible from water, and having a sp. gr. 1.262, add it cautiously and in small quantities at a time to 18 ounces of monohydrated nitric acid, sp. gr. 1.52, previously immersed in a freezing mixture. The temperature rises upon each addition. It is therefore necessary to allow the mixture to cool down again to 14° F. before any fresh addition is made, as it is very necessary that the temperature should never rise above 32° F. When the Glycerin and nitric acid have formed a homogeneous fluid, which may be facilitated by stirring the mixture with a glass rod, 18 ounces of concentrated sulphuric acid, sp. gr., 1.845, are cautiously and slowly added. This operation is accompanied with the greatest danger, if the temperature is not continually watched. Experience, however, shows me that there is no reason for fear provided the temperature be always kept below 32° F. When these precautions have been taken, the nitro-glycerin separates after the addition of the sulphuric acid, in the form of an oily liquid floating on the surface, and may be collected by means of a separating funnel. To purify it from any trace of acid, dissolve it in a small quantity of ether, and shake the solution repeatedly with water, then heat it over a water-bath till nothing more is volatilized."

When exposed to light, or a warm temperature, Glonoïne undergoes decomposition. This article has been used as a medicine for some time by homeopathists. It is said to exert a peculiar action upon the nervous system: two to four drops of a solution of one drop of Glonoïne in ninety-nine drops of alcohol, are said to cause fullness in the head, slight headache, acceleration of the pulse, perspiration, nausea, etc.

Properties and Uses.—Stimulant, antiseptic, and demulcent. Used in prurigo, psoriasis, impetigo, lichen, lepra, ptyriasis, herpes exedens, and some syphilitic and strumous affections. From one-third to one-twelfth of Glycerin may be added to washes or cataplasms, to render them soothing, and to keep the latter moist for some time. It acts as an emollient and soothing application, absorbing moisture from the air, and preventing the parts to which it is applied from becoming too dry. One-sixteenth of a grain, added to a few grains of borax and rose-water, furnishes one of the most elegant and efficacious washes for chapped hands, face, lips, or nipples. A small quantity of Glycerin added to pills or extracts, will preserve them from becoming hard and moldy. It has been highly recommended for deafness, in which there is a partial or total absence of ceruminous secretion, by protecting the tympanum, and gradually restoring the parts to their natural condition; it is likewise said to cause hearing in cases where the tympanum is thickened and indurated, or where it is in a sound state or destroyed by ulceration; but in this last case it is not permanent; and when there is a hardness of the cerumen, and induration of the tympanum, it has proved successful. The plan is to moisten wool with the Glycerin, pure or diluted with water, and pass it into the ear. The bland and unirritating character of pure Glycerin, its permanence when exposed to the atmosphere, and the completeness with which it shields the parts covered by it, render it susceptible of many important applications. Mr. J. H. Ecky has given a formula for the preparation of a Glycerin ointment, especially useful for chapped hands, lips, excoriations of the skin, etc. It will also serve as a medium for applying powders, etc., to ulcers, cutaneous affections, or other difficulties, by combining them with it, in the desired proportions. The formula is as follows: Melt together spermaceti half an ounce, and white wax one drachm, with oil of almonds two fluidounces, at a moderate heat; put these into a Wedgewood mortar, add Glycerin one fluidounce, and rub together until well mixed and cold. Mr. Wilson recommends Glycerin as an injection into the bladder to dissolve calculous deposits, especially urea, and phosphate of lime; alse to be used as a substitute for syrups in preserving fruits; mixed with alcohol or pyroxylic spirit as an economical fuel for spirit-lamps; and as a remedy in disease of the mucous membrane of the stomach. Dr. Wm. Bayes advises a solution of tannic acid in pure Glycerin as a local application to local hemorrhages, by a sponge or brush, also to the vaginal, uterine, urethral, rectal, or nasal membranes, where a strong and non-irritant astringent lotion is desired. Glycerin dissolves nearly its own weight of tannic acid; the solution should be recently prepared, and be kept in the dark, else it will decompose.

Dr. Goddard has given a formula for a very adhesive Glycerin paste, suitable for fixing paper labels to glass and other surfaces, and which keeps well; it is to dissolve an ounce of gum Arabic in two fluidounces of boiling water, add two fluidrachms of Glycerin, and strain if necessary. This forms a valuable paste for druggists, chemists, and others. A Glycerin jelly is prepared by intimately mixing half a drachm of soft soap with two fluidrachms of pure honey, then gradually adding five ounces of clear olive-oil, stirring without intermission until all the oil is taken up. Care must be taken not to add the oil too fast. Or it may be prepared by rubbing and mixing well together half an ounce of powdered gum Arabic, and four ounces of simple syrup, then add the yolks of three eggs, and when well mixed, add gradually four ounces of olive-oil, and two ounces of Glycerin previously mixed together.

A *Glycerin Balsam* for chapped lips and hands is made by melting together one ounce, each, of white wax and spermaceti, then stirring in half a pound of sweet almond-oil and two ounces of Glycerin, and when nearly cold, half a drachm of otto of roses.

GLYCYRRHIZA GLABRA.

Liquorice.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE ROOT.

Description.—The Liquorice-plant has a perennial, cylindrical *root*, running to a considerable length and depth, grayish-brown externally, yellow internally, succulent, tough, flexible, rapid in growth, and provided with scattered fibers. The *stems* are erect, herbaceous, smooth, striated, with few branches, of a dull, glaucous-gray color, and growing two or three feet in height. The *leaves* are alternate, unequally pinnate; the *leaflets* are generally about thirteen, oval, entire, obtuse, slightly emarginate, viscid, one terminal; *stipules* inconspicuous. The *flowers* are small, bluish or purplish, and are arranged in axillary, erect spikes, shorter than the leaves, and arranged on long peduncles. The *calyx* is persistent, tubular, bilabiate, and five-cleft. The *corolla* consists of a straight, ovate-lanceolate, vexillum; *keel* biparted, acute, straight. *Stamens* diadelphous; *anthers* simple, rounded; *style* filiform; *stigma* blunt. *Legumes* oblong, compressed, one-celled, one to four seeded; *seeds* small, reniform.—*L.*—*Wi.*

History.—This plant inhabits Southern Europe, and some parts of Asia, and is cultivated in England. The root is imported from Spain and Sicily; it is the officinal part, and is met with in dry, cylindrical pieces of various lengths, generally about as thick as the little finger, though it may be much smaller or nearly twice as large, wrinkled longitudinally, grayish-brown externally, internally tough, fibrous, and yellow, so dense as to sink in the water, of a faint odor, and a sweet, peculiar taste, slightly acrid. Its powder is brownish-yellow, or pale-yellow, if made of decorticated root. It must be kept in a dry place or it will spoil. Its active part is soluble both in water and in alcohol. A concentrated watery solution is acidulous. Those roots are to be preferred which are not worm-eaten or decayed, and whose fractured surfaces are bright yellow. Robiquet found in the root glycyrrhizin, starch, asparagin, resinous oil, albumen, woody fiber, and salts.—*P.* *Glycyrrhizin* may be obtained from a concentrated infusion of the root by precipitating it with sulphuric acid, washing the precipitate, first with water acidulated with the same acid, and then with a very little pure water, dissolving what remains in alcohol, neutralizing the alcoholic solution with carbonate of potassa, and then gently evaporating the filtered fluid to dryness.—(*Berzelius*). Thus obtained it is a yellowish, transparent, brittle, uncrystallizable substance of a most intense sweet taste; is soluble in water and alcohol, and is precipitated from its aqueous solution by acids. It is not susceptible of vinous fermentation, does not yield oxalic acid when treated with nitric acid, and differs in other respects from ordinary sugar. It precipitates many metallic solutions, and combines with bases, retaining its sweetness. Carbon, hydrogen, and oxygen are its elementary constituents.

The black cylindrical sticks met with in the shops, are an extract of Liquorice-root (*Extractum Glycyrrhizæ*), which are prepared in some of the Southern European countries; they are in the form of hard, black cylinders, which are prepared by inspissating the decoction in copper kettles, till the mass is thick enough to become firm on cooling. The finest kind comes from Italy, and is stamped with the maker's name, "Solazzi." Water slowly dissolves from three-fifths to eleven-twelfths of it, alcohol only about one-eighth, and acquires an acrid taste, while the residuum is purely sweet, and entirely soluble in water.

The impure extract is in slightly compressed and cylindrical sticks, about six inches long, and from nine to twelve lines in diameter, being enveloped in sweet bay leaves. The best kind is dark-brownish-black, smooth, shining, brittle when cold, tough and flexible when warm, very sweet, and soluble in water. It should be freed from its impurities for internal use. A very excellent extract is made in New York; also by the Messrs. Tilden & Co.

To purify Liquorice, the crude extract is dissolved in water without boiling, the solution strained, and evaporated to the proper consistence. Sometimes gum, glue, or starch, is added during the process. Before the extract becomes perfectly dried it is rolled into long, round pieces about the thickness of a quill, and is called *Refined* Liquorice. If the water be boiled during the purification, much of the impurity may be taken up, as well as the acrid oleo-resinous principle of the Liquorice, which is not desirable. According to Geisler, refined Liquorice is rendered more permanently hard and brittle by the addition of powdered Liquorice-root, and its liability to absorb moisture is lessened by the addition of sugar of milk.

The *Glycyrrhiza Lepidota*, which grows in Missouri, possesses the taste of Liquorice to a considerable degree.

Properties and Uses.—Liquorice-root is an emollient, demulcent, and nutritive. It acts upon mucous surfaces, lessening irritation, and is consequently useful in coughs, catarrhs, irritation of the urinary organs, and pain of the intestines in diarrhea. It is commonly administered in decoction, sometimes alone, at other times with the addition of other agents, and which is the preferable mode of using it. As a general rule, the acrid bark should be removed previous to forming a decoction. When boiled for some time the water becomes impregnated with its acrid resin; hence, in preparing a decoction for the purpose of sweetening diet drinks, or covering the taste of nauseous drugs, it should not be boiled over five minutes. The efficacy of the root in old bronchial affections may be due to this acrid resin. The powdered root is also employed to give the proper solidity to pills, and to prevent their adhesion; the extract for imparting the proper viscidity to them. The extract, in the form of lozenge, held in the mouth until it has dissolved away, is a very popular and efficient remedy in coughs and pectoral affections. An excellent troche or lozenge, very useful in ordinary cough, may be made by combining together, six parts of refined Liquorice, two parts of benzoic acid, four parts of pulverized alum, and half a part of pulverized opium. Dissolve the Liquorice in water, and evaporate to the proper consistence, then add the powders with a few drops of oil of anise, and divide it into three or six grain lozenges.

Off. Prep.—Confectio Sennæ; Decoctum Glycyrrhizæ; Extractum Glycyrrhizæ; Tinctura Aloës.

GNAPHALIUM POLYCEPHALUM.

White Balsam.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—This plant, also known by the various names of *Indian Posy*, *Sweet-scented Life Everlasting*, *Old Field Balsam*, etc., is indigenous, herbaceous, and annual, with an erect, whitish, woolly, and much branched *stem*, from one to two feet in height. The *leaves* are alternate, sessile, linear-lanceolate, acute, entire, scabrous above, and whitish tomentose beneath. The *flowers* are tubular and yellow; in *heads* clustered at the summit of the panicled-corymbose branches, ovate-conical before expansion, then obovate. *Involucre* imbricate, with whitish, ovate and oblong, rather obtuse scales. *Florets of the ray*, subulate—*of the disk*, entire. *Receptacle* flat, naked; *pappus* pilose, scabrous capillary.— *W.*— *G.*

History.—White Balsam is found in Canada, and various parts of the United States, growing in old fields, and on dry, barren lands, and bearing whitish-yellow flowers in July and August. The leaves have a pleasant, aromatic smell, and an aromatic, slightly bitter and astringent, but rather agreeable taste. They yield their properties to water. No analysis has been made of them. The *Antennaria Margaritacea*, formerly *Gnaphalium Margaritacea*, or Pearl-flowered Life Everlasting, a perennial plant, possesses similar properties to the above.

Properties and Uses.—Astringent. The leaves and blossoms chewed, and the juice swallowed, has proved beneficial in ulcerations of the mouth and throat. A warm infusion may be used in fevers to produce diaphoresis, and is of service in quinsy, pulmonary complaints, leucorrhea, etc.; it may be used internally and as a local application. Likewise used in infusion, in diseases of the bowels, and hemorrhages, and applied in fomentation to bruises, indolent tumors, and other local affections. The fresh juice is reputed anti-aphrodisiac.

Off. Prep.—Infusum Gnaphalii.

GOODYERA PUBESCENS.

Net-leaf Plantain.

Nat. Ord.—Orchidaceæ. *Sex. Syst.*—Gynandria Monandria.

THE LEAVES.

Description.—This plant, likewise known by the names of *Scrofula-weed*, *Adder's Violet*, *Rattlesnake-leaf*, etc., has a perennial *root*, from which arises an erect, sheathed and pubescent *scape*, from eight to twelve inches in height. The *leaves* are radical, ovate, dark-green, conspicuously reticulated and blotched above with white, about two inches in length, and contracted at base into winged petioles scarcely half as long. The *flowers* are white, numerous, pubescent, in a crowded, terminal, oblong, cylindric *spike*. *Lip* ovate, acuminate, saccate, inflated. *Petals* ovate. The *Goodyera Repens* is a reduced variety of the above, the *scape* being from six to eight feet in height, the *leaves* less conspicuously reticulated, and the *flowers* being on a somewhat unilateral spike, more or less spiral; in other respects about the same as the preceding.—*W.*—*G.*

History.—This herb grows in various parts of the United States, in rich woods, and under evergreens, and is common southward, while the G. Repens is more common northward and on mountains. It bears white, or yellowish-white flowers in July and August. The leaves are the parts employed, and yield their virtues to boiling water. No analysis has been made of them.

Properties and Uses.—Net-leaf Plantain is antiscrofulous, and is reputed to have cured severe cases of scrofula. The fresh leaves are steeped in milk and applied to scrofulous ulcers as a poultice, or the bruised leaves may be laid on them, and in either case, they must be renewed every three hours; at the same time a warm infusion must be taken as freely as the stomach will allow. Used as an injection into the vagina, and at the same time exhibited internally, the infusion has proved beneficial in leucorrhea, recent prolapsus uteri, and as a wash in scrofulous ophthalmia.

Off. Prep.—Infusum Goodyeræ.

GOSSYPIUM HERBACEUM.

Cotton.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE FILAMENTOUS MATTER SURROUNDING THE SEEDS, AND INNER BARK OF THE ROOT.

Description.—G. Herbaceum is a biennial or triennial herb, with a fusiform root, giving off small radicles, and a round, pubescent, branching stem about five feet high. The *leaves* are hoary, palmate, with five sublanceolate, rather acute lobes, three large, and two small, lateral, a single gland on the midvein below, half an inch from the base. *Stipules* falcate-lanceolate. The *flowers* are yellow; *calyx* cup-shaped, obtusely five-toothed, surrounded by an involucel of three united and cordate leaves, deeply and incisely toothed; *petals* five, deciduous, with a purple spot near the base. *Style* simple, marked with three or five furrows toward the apex. *Stigmas* three or five. *Capsules* three or five celled, three or five valved, loculicidal; *seeds* three or five, involved in cotton, somewhat plano-convex and reniform.—*W.*—*R.*—*W. I.* GOSSYPIUM BARBADENSE or Sea Island Cotton Plant, is a larger plant than the preceding; the *leaves* are five-lobed with three glands beneath, upper ones three-lobed; Cotton white, and seeds black. It is likewise biennial or triennial.—*W.*

History.—Cotton is an Asiatic plant, but is extensively cultivated in India, Syria, Asia Minor, the Mediterranean, and America. Cultivation has considerably changed the plant so as to render it difficult for botanists to correctly describe the originals. Several species have been named by authors, which Swartz and Macfadyen believe to be mere varieties of one species; while Wight, and Arnold, and Hamilton, believe that there are but two distinct species, the *G. Album*, whose seeds are white, and the *G. Nigrum*, whose seeds are black. The various Cotton plants differ considerably in the form of the leaf and its gland, the height of the plant, the hue of the petals, and the elongation and delicacy of the Cotton. The plant can not be profitably cultivated north of the Ohio river, or above that latitude. The leaves are very mucilaginous, and have been used in cases where mucilage is required. A fixed oil is contained in the seeds, which may be procured by pressure; it is a drying oil. The part used in medicine is the inner bark of the root, and the white, downy substance contained in the matured capsule, and known as "Cotton." When examined microscopically, the filaments constituting Cotton are seen to consist of distinct, flat, narrow ribbons or tubular hairs, with occasional appearances of joints, indicated by lines at right angles to the side of the tube. Cotton is tasteless, odorless, highly combustible, and, according to Thompson, not soluble in alcohol, water, ether, oils, or vegetable acids; weak alkaline liquids have no perceptible action on it, but when very strong, they dissolve it by the aid of heat. Tannic acid forms a brown or yellow compound with it; nitric acid decomposes it when assisted with heat, oxalic acid being formed; sulphuric acid chars it. The strong mineral acids, generally, decompose it. Gun Cotton is prepared from it (see *Collodion*). Cotton root contains gum, albumen, sugar, starch, tannic acid, gallic acid, chlorophylle, iodine, caoutchouc, black resin, red extractive matter, and black and white oleaginous-like matter. The carded Cotton is usually preferred in medicine.

Properties and Uses.—The bark of the root of the Cotton plant is emmenagogue, parturient and abortive. It is said to promote uterine contraction with as much efficiency and more safety than ergot; and is used by the slaves of the South for inducing abortion, which it does without any apparent detriment to the general system. Four ounces of the inner bark of the root is boiled in a quart of water down to a pint, the dose of which is one or two fluidounces every twenty or thirty minutes. The hydro-alcoholic extract forms an excellent emmenagogue, and may be used in chlorosis, amenorrhea, dysmenorrhea, etc. It is very doubtful whether this will ever take the place of other more certain parturients. In my own practice, it failed in producing any influence upon the uterus during parturition in about one-half the cases in which it has been used, owing, probably, to its not being fresh enough. It operated exceedingly well in the first cases in which it was exhibited.

The *seeds* are reputed to possess superior antiperiodic properties. A pint of Cotton seed placed in a quart of water and boiled down to one pint, and one gill of the warm tea given an hour or two before the expected chill, is said to cure intermittent fever with the first dose. The flowers and leaves are reputed diuretic, and useful in urinary affections; the leaves steeped in vinegar are said to relieve hemicrania when locally applied, and a decoction is considered beneficial in the bites of venomous reptiles in Brazil. Externally, Cotton is used as a local application in erysipelas, erythema, fresh burns, wounds, severe bruises or contusions, in rheumatic pains, and has been successfully employed in dressing blisters. In burns and blisters, care must be taken that the Cotton does not harden and adhere firmly to the part over which it is applied, as it will then cause irritation the same as any other foreign body; this may usually be avoided by first applying some simple oleaginous substance over the surface which is to come in contact with the burn or ulcer. Cotton is supposed to prove efficacious by excluding the air from the parts over which it is applied, and also by imbibing the secretions.

Off. Prep.—Decoctum Gossypii Radicis; Decoctum Gossypii Seminis Extractum Gossypii.

GUAIACUM OFFICINALE.

Guaiacum.

Nat. Ord.—Zygophyllaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WOOD AND RESIN.

Description.—This tree grows very slowly, varying in height from fifteen to fifty feet; its *trunk* is usually crooked, with crowded, knobby, short-jointed, flexuose, spreading branches, and is about four feet in diameter; the *bark* is furrowed, spotted, grayish. The *leaves* are opposite, bijugate or trijugate; *leaflets* sessile, more or less obovate, rounded at the apex, nerved, glabrous; *common petiole* terete, channeled above. The *flowers* are light-blue, on axillary peduncles, which are an inch long, one-flowered, filiform, minutely downy, several together. *Calyx* of sepals, two exterior, somewhat broader than the others; all obtuse and hoary with down. *Petals* five, thrice the length of the sepals, oblong, bluntish, unguiculate, internally downy. *Stamens* ten, without scales; *filaments* twice the length of the sepals, grooved on the back; *anthers* bifid at the base, curved. *Ovary* two-celled, with numerous suspended ovules, compressed; *styles* short, acute, subulate; *stigma* simple. *Capsule* obcordate, succulent, glabrous, yellow, two to five celled; on short stalks, somewhat fleshy, angular; *seeds* solitary, compressed, roundish, smooth, pendulous.—*L.*

History.—This tree inhabits the West Indian Islands, especially Jamaica, St. Thomas, and St. Domingo. The wood, and resin or solidified juice are the parts used in medicine, though the whole tree possesses medical virtues. The bark is said to be the most active part of it, but it is seldom met with in commerce. The wood of this tree has been used as a medicine by the natives previous to the discovery of the country, and who made it known to the Europeans; by these it was introduced into Europe in the sixteenth century, and employed with much advantage in syphilitic affections. Guaiacum wood, also known as *Lignum-vitæ*, a name given to it from a belief that its medicinal virtues were of a superior kind, is largely imported into this country from the West Indies for making block-sheaves, wooden-pestles, and many other objects, for which it is peculiarly fitted by its extraordinary hardness and toughness. It is imported in billets, about a foot in diameter, and generally without the bark. The bark is hard, flat, a few lines thick, of a greenish-black color, with yellowish and grayish spots, inodorous, but very acrid. The wood, as used in medicine, consists of turnings, from the workshop of the turner, and is a uniform mixture of the alburnum and duramen.

The alburnum or sap-wood is of a yellow color, that of the duramen or heart-wood, greenish-brown, and which are mixed in about equal proportions in the shavings. Guaiacum wood is only odorous when burned or rasped, the odor being aromatic; its taste is acrid, aromatic, and amarous, succeeded by a pricking in the throat, more especially from chewing the alburnum. It is very dense, hard, and tough, and of sp. gr. 1.333, sinking in water. When a very fine powder of Guaiacum-wood is acted upon by the atmosphere, its color is converted into green. Nitric acid turns it bluish-green, as does also a solution of bichloride of mercury, when applied to the coarse raspings, and moderately warmed. These tests may be employed to determine the authenticity of the wood. Boiling water and alcohol take up its active parts—the alcohol dissolving 21 per cent., the water 14. Trommsdorf found the wood to consist of resin, bitter piquant extractive, mucous extractive with a vegetable salt of lime, coloring matter and woody fiber. Jahn found a trace of benzoic acid. Several other trees of this family are said to furnish the Guaiacum wood, as the *G. Sanctum*, which has a translucent, paler-yellow, and less heavy and hard wood, and also the *G. Arboreum*. When Guaiacum wood is adulterated with the shavings of other wood, it may be detected by treating with a solution of chloride of lime, which effects no change in the other woods, but causes the Guaiacum to assume a green color in a few seconds. *Guaiacic acid*, or *Guaiacin*, is obtained from the resin.

Properties and Uses.—Taken internally, Guaiacum, both the wood and resin, commonly excites a sense of warmth in the stomach, a dryness of the mouth, with thirst. They act upon the economy like stimulants, increasing the heat of the body and accelerating the circulation. If the body be kept warm while using the decoction, which is the form generally preferred, it will prove diaphoretic; if cool, diuretic. As a diaphoretic and alterative, it has been administered (but usually in compound decoction or syrup), in chronic rheumatism, chronic cutaneous diseases, scrofula, and syphilitic diseases. As water can not take up much of the active principle in the wood, it is probable that its reputed efficacy was owing principally to the active agents associated with the syrup or decoction. The resin of Guaiacum is the active principle, which see. The decoction of Guaiacum shavings may be made by boiling two ounces of the shavings in three pints of water down to two pints; the dose of which is from two to four fluidounces every three or four hours.

Off. Prep.—Decoctum Guaiaci; Syrupus Sarsaparillæ Compositus.

GUAIACI RESINA.

Guaiac.

THE RESINOID SUBSTANCE OF GUAIACUM OFFICINALE.

History.—The resin of Guaiacum, or *gum guaiacum* as it is erroneously called by some, is procured from the wood of the tree, by natural exudation; by jagging or wounding the tree in several places; by heat applied to the wood sawed into large billets; and by boiling the chips of the wood in water and salt, and skimming off the resin as it floats on the surface.—*Ed.*—*P.* The last two modes are the most common. Guaiacum is ordinarily met with in large, amorphous, hard masses of varying sizes, in which are found pieces of wood, dirt, and other foreign matters. Its color is reddish-brown or hyacynthine when recent, but from the action of the air, the surface is generally of a dark pistachio green, which enters into the cracks and fissures. It is friable, presenting a splintery, vitreous fracture, and thin lamina of it are translucent. It has a slight, peculiar, aromatic odor, and a sweetish, faintly bitter taste, succeeded by a durable acrimony, especially in the fauces. It does not soften by the heat of the hand, becomes tough when chewed, and is fusible at a moderate heat. Its specific gravity is 1.20 to 1.23. It is readily reduced to a grayish-white powder, becoming somewhat tenacious, and quickly aggregating, by the action of the air, and gradually acquiring a green color.—*Ed.*—*Dunc.* Alcohol dissolves it readily, forming a dark reddish-brown fluid, from which the Guaiac is precipitated by water, by sulphuric or muriatic acid. Ammoniated alcohol, or solutions of the fixed alkalies dissolve it. Ether does not readily dissolve it; fixed and volatile oils scarcely at all. Water dissolves about nine parts in one hundred of the resin, becoming colored greenish-brown and having a sweet taste; and upon evaporating the water from the infusion a brown substance is obtained which is soluble in hot water or alcohol, but hardly at all in ether. Sulphuric acid forms with Guaiac a deep-red solution; nitric acid dissolves it without the aid of heat, and with strong effervescence, and when the solution is evaporated, it yields oxalic acid and an extractive substance, but no artificial tannic acid.—*T.* Jahn found the resin to contain three resins, one soluble in ether or ammonia; another soluble in ether but not in ammonia; and another soluble in ammonia but not in ether; the remainder consisting of bark, wood, impurities, and a trace of benzoic acid.—*C.*

Guaiac is subject to adulteration with pine resin, and other substances; this may be detected by observing, that the genuine article when freshly fractured is green, not red; that the tincture of the spurious article will not render the recently-cut surface of a potato, carrot, or other plants containing gluten or milk, mucilage of gum Arabic, etc., blue—which change will be effected by the tincture of the genuine Guaiac; that when heated, Guaiac does not exhale a turpentine odor; that oil of turpentine dissolves resin, but not Guaiac; and that paper which has been moistened by the tincture of Guaiac, speedily becomes blue on exposure to the vapors of nitric acid. The substances which are *incompatible* with Guaiac, are mineral acids.—*E. & V.*

Guaiacin or *Guaiacic acid* may be obtained by forming a solution of the resin in ether, evaporating the solution, and submitting the substance left to sublimation. The minute acicular crystals which are thus formed are not dissolved by water, but are soluble in alcohol, from which they are precipitated by water, chlorine, nitric and sulphuric acids. Ether dissolves them more gradually than alcohol. They form guaiacates or guaiacum soaps with the alkalies, from which they are precipitated by the mineral acids and by various salts.—*P.*

Dr. L. E. Jonas states that the fourteen thousandth part of a grain of resin of guaiacum may be detected, when added to other resins (scammony, jalap, etc.), as an adulteration, by making an alcoholic solution of the suspected resin, and moistening very clean strips of filtering paper with it, and then while still moist, introducing the paper into the mouth of a glass-vessel half-filled with chlorine liquor; or the bottom of which is covered with free iodine, without, however, bringing the paper in contact with either of these two substances, in which case no reaction would take place. If Guaiac resin be present there is a blue and green change of color. He also states that under certain circumstances, strips of blotting-paper, impregnated with the alcoholic solution of resin of Guaiacum, are reagents for detecting the presence of dry vapors of the so-called halogen, and of nitrous acid in a very sensible manner; for this paper-test is quite indifferent to gaseous hydrochloric acid, sulphuric acid, acetic acid, and formic acid, very probably also to all other oxygen acids that are not ozonized that yield no oxygen.

Properties and Uses.—Guaiac is stimulant. Taken internally it produces the same effects as named for the wood, but in a more active degree. Large doses act as a cathartic. It is used in the same affections as the Guaiaci Lignum or guaiacum wood. Several practitioners have found it beneficial in amenorrhea, dysmenorrhea, and other uterine diseases; likewise in acute dysentery, in which its employment is said to be followed by speedy beneficial results. It is much used in chronic rheumatism, and in the abating stages of the acute form, and has proved a most valuable agent in these diseases. It is said to be an antidote to the effects of the tincture of *Rhus Toxicodendron.* If the preparations of guaiacum produce sickness, defective appetite, and irregularity of the bowels, their use must be discontinued. Dose of the powdered resin, from five to twenty grains; of the tincture, from one to four fluidrachms, either of which may be repeated three or four times a day. A mixture of ten grains each of Guaiac and compound powder of ipecacuanha and opium, has been found of advantage in rheumatism and dysentery.

Off. Prep.—Tinctura Guaiaci; Tinctura Guaiaci Aromatica; Tinctura Guaiaci Ammoniata.

GUNPOWDER.

(Pulvis Pyrius. Pulvis Nitratus.)

History.—Gunpowder is prepared by combining together, five or six parts of nitre, with one part of each, of charcoal and sulphur; however, these proportions vary with the different manufacturers of the article, so that there is no regular or officinal method for its preparation. The uses of gunpowder, aside from medicine, are too well known to require any description.

Properties and Uses.—Recommended as a detergent and alterative in chlorosis, and dyspepsia, also as a corrective of morbid secretions of the gastro-mucous membrane, dependent on, or accompanied with subacute inflammation. Dose, ten grains, three or four times a day, gradually increased, occasionally using a mild laxative. Externally, applied in powder or ointment to indolent ulcers, and several forms of cutaneous diseases. Gunpowder dissolved in water, and the solution taken in teaspoonful doses three or four times in twenty-four hours, and continued daily, has cured gonorrhea. Dr. Bone and Dr. Henry, two celebrated botanic practitioners of some thirty or forty years since, made considerable use of this article in the treatment of some forms of cutaneous disease, indolent ulcers, and even cancers; the following is the formula they employed: Simmer one pound of the inspissated juice of poke for a short time, on hot ashes, until the aqueous portion has evaporated; then place it in an iron dish, add to it a pound of fresh butter, and half a pint of finely pulverized gunpowder, and place it over a fire, where it must be kept until it is so far dried that the mixture will flash once or twice; or if it should take fire instead, it must be immediately smothered. Remove it into a glazed pipkin, and let it remain on hot ashes until it is well incorporated, when it may be transferred into pots, and covered with alcohol to prevent it from molding. This ointment applied twice a day, is reputed to destroy cancer to its extreme fibers or roots.

Off. Prep.—Lotio Hydrastii Composita.

GUTTA PERCHA.

Gutta Percha.

Nat. Ord.—Sapotaceæ. *Sex. Syst.*—Decandria Monogynia.

CONCRETE JUICE OF ISONANDRA GUTTA.

Description.—This is the concrete milky juice of a tall tree, a native of the Malayan Archipelago, especially of Singapore. It has a straight and lofty trunk, about three feet in diameter at the base, with numerous ascending branches; terminal buds white from exuding gutta. The wood is hard. The *leaves* are crowded at the extremity of the branches, alternate, petiolate, oblong, with a small point at the apex, base tapering, four or five inches long, two inches broad, upper surface bright green, feather-nerved, under surface brownish-red, from dense pubescence; midrib and petiole the same; the *petiole* an inch long, channeled, not articulated with the stem. *Stipules* none. *Flowers* axillary, sessile, four together, disposed in a quadrangular manner, small and white. *Bracts* none. *Calyx* persistent, six sepals, brownish-red, in a double series, the outer largest. *Œstivation* valvate. *Corolla* monopetalous, six-cleft, lobes one-fourth of an inch long, tubes half an inch, deciduous; *æstivation* twisted. *Stamens* twelve, in a single series, equal, similar, inserted in the mouth of the tube. *Filaments* equal in length to the lobes of the corolla; *anthers* sagittate, extrorse, and affixed by their base to the filaments; *pollen* scanty. *Ovary* superior, conical, sessile, seated on a disk, six-celled, each cell containing a single ovule suspended from a central axis; funiculus conspicuous. *Style* longer than the stamens, persistent; *stigmas* undivided.—*E. White.*

History.—This substance was introduced in 1842 to the profession, by Dr. William Montgomerie, a surgeon in the British army in the Indies. The natives cut down the tree, remove its bark, and collect the milky juice in troughs, which speedily concretes on exposure to the air. Each tree yields from twenty to thirty pounds. As imported, it contains various foreign matters from which it should be freed before using it. It is a white or dirty-pinkish opaque solid, having a faint odor, no taste, and hard at 60° F. Water, alcohol, alkaline solutions, muriatic and acetic acids, have no action on it. Oil of turpentine is its best solvent; it is likewise soluble in coal naptha, benzole, chloroform, and bisulphuret of carbon. Hot water softens it, and a heat of 160° renders it adhesive and pliable; when soft it may be easily cut. It resembles caoutchouc, and like this substance is vulcanized for use in the arts. Its specific gravity is 0.979. The commercial article consists of pure Gutta Percha, a vegetable acid, casein, a resin soluble in ether or oil of turpentine, and a resin soluble in alcohol. It is a carbo-hydrogen, analogous to caoutchouc.—*Pharm. Jour.*, *VI.*, 377.—*P.*

Properties and Uses.—Gutta Percha serves several useful ends in medicine, surgery, and pharmacy; and is likewise used for ornamental and various other purposes. Splints, etc., have been made of it, and employed in cases of fractures, diseased joints, and other cases where it is desired to keep the parts in a permanent position, and it is also formed into bougies, injection pipes, catheters, pessaries, forceps-handles, etc. The solution in bisulphuret of carbon has been employed by M. Vogel in wounds effected by cutting instruments—the fluid evaporates with great rapidity, and leaves a thin layer which protects the wound from atmospheric action, at the same time keeping its edges in close contact. The following compound is recommended for the hemorrhage supervening the extraction of teeth. Take of Gutta Percha an ounce; best tar an ounce and a half; creosote a drachm; shell-lac an ounce. Boil these in a crucible, stirring or beating them well, until they are blended into a stiff, homogeneous mass. The compound is readily softened between the fingers, and is easily introduced into the bleeding socket. It must be pressed in, and the hemorrhage will be speedily checked. Mr. Acton recommends the following preparation, applied to the skin in the same manner as collodion, as a protection against poisonous or deleterious vapors or fluids; add thirty grains of Gutta Percha to half an ounce of benzole, and expose to a moderate heat; when the Gutta Percha is dissolved, add to it a solution of five grains of caoutchouc dissolved in half an ounce of benzole. An improved cement for uniting the parts of boots and shoes, and in the manufacture of articles of dress in which cement is required, is made of 64 parts by weight of Gutta Percha, 16 parts of caoutchouc, 8 parts of pitch, 4 parts of shell-lac, and 8 parts of oil; the ingredients are melted together, the caoutchouc having been previously dissolved. A cement for uniting sheet Gutta Percha to silk or other fabrics, is composed of Gutta Percha 40 lbs., caoutchouc 3 lbs., shell-lac 3 lbs., Canada balsam 14 lbs., liquid styrax 35 lbs., gum mastic 4 lbs., and oxide of lead 1 lb. Another for uniting it to leather, as soles of shoes, etc., consists of: Gutta Percha 50 lbs., Venice turpentine 40 lbs., shell-lac 4 lbs., caoutchouc 1 lb., and liquid styrax 5 lbs.

Dr. Maunoury recommends mixing two parts of chloride of zinc with one part of powdered Gutta Percha, in a tube or porcelain dish, and gently heating the mixture over a lamp. The Gutta Percha softens, the particles cohere in a spongy mass, which retains the chloride of zinc, and may be made into any convenient shape, which it retains on cooling. This he recommends as a more manageable caustic, retaining its consistence and flexibility, can be easily inserted into the urethra, nostrils, fistulous or other passages, and, by its porosity, permits the exudation of the caustic, and thus opens a free passage for the result of the action of the caustic on the tissues. Other caustics or agents may be applied in the same way.

J. M. Maisch proposes the following solution as preferable to collodion in having no gloss or contractile power, and in its close resemblance to the skin: Take one part of the best commercial Gutta Percha, cut it into small pieces, and by agitation dissolve it in twelve parts of chloroform; on standing for a day all the coloring matter rises like scum to the surface, leaving the solution clear; this may then be easily drawn off to the last drop. A wide glass tube, narrower on the bottom, and so arranged that both ends may be closed by corks, is the only instrument necessary; after the separation is complete, the upper cork must be removed and the lower one loosened so as to allow the liquid to run out slowly.

Gutta Percha is acted upon by the strong mineral acids, but not by sea-water, alkalies, vegetable acids, or weak mineral acids; hence, Gutta Percha vessels are highly valuable.

HÆMATOXYLON CAMPECHIANUM.

Logwood.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WOOD.

Description.—This is a tree of from twenty to twenty-five feet in height, and occasionally reaching forty or fifty feet. The *trunk* or *stem* is generally crooked and deformed, seldom exceeding eighteen inches in diameter and covered with a rough, ash-colored bark. The *branches* are somewhat flexuose, terete, covered with whitish spots; in mountains and moist situations they are unarmed, but in localities where the tree is stunted in growth, they are furnished with sharp spines below the leaves. The *leaves* are alternate, two to four from the same irregular, rough tubercular prominence, pinnate, sometimes dividing in a bipinnate manner, at the lowest pair of leaflets; *leaflets* four-paired, shortly stalked, obovate, or obcordate. The *flowers* are yellow, slightly fragrant, on pedicels half an inch in length, and collected in axillary and subterminal racemes. The *calyx* is deeply five-parted, brownish-purple, with thin, membranous, deciduous, unequal lobes, and a short, green, campanulate tube. The *petals* are nearly equal, obovate, wedge-shaped at base, scarcely longer than the sepals, and of a lemon-yellowish color. The *stamens* are ten, alternately short, inserted on the inside of the margin of the persistent tube of the calyx; *filaments* hairy at base; *anthers* ovate, and without glands. The *ovary* is lanceolate, compressed, three-seeded, bearing a capillary style, which projects beyond the stamens and petals; *stigma* capitate, expanded. The *pod* or *legume* is flat, compressed, lanceolate, acuminate at both ends, one-celled, two-seeded, not opening at the sutures, but bursting in the middle longitudinally.—*L.*

History.—This tree grows in Jamaica, on the eastern shore of the bay of Campeachy, and in many of the West India islands. The wood consists of a yellowish alburnum, and a dingy cherry-red inner wood, which last is the part used in medicine and the arts; it forms a useful commercial commodity, and is extensively used as a dye-stuff. It is imported in heavy, hard, close-grained billets, which are cut into chips or rasped into a coarse powder, for general use. It becomes darker-colored by exposure, has a sweetish, somewhat astringent, and peculiar taste, and a slight, rather pleasant odor. Water or alcohol extracts its coloring matter, forming deep-purple solutions. Its aqueous solution yields a fine blue precipitate with lime-water, alum, acetate of lead, a deep violet blue with the salts of sesquioxide of iron, and curdy flakes with solution of gelatin; sulphuric, nitric, muriatic and acetic acids, and sulphate of copper also produce precipitates. Water is the menstruum usually employed to extract its virtues. A pound of the wood yields about two ounces of extract. It has been analyzed several times, and is found to contain volatile oil, hæmatin, fatty or resinous matter, a brown substance containing tannic acid, acetic acid, glutinous matter, various salts, woody fiber, etc. *Hœmatin* or *Hœmatoxylin* may be obtained by digesting the raspings of logwood in water of a temperature between 122° and 131° F., till every thing soluble is taken up. Evaporate the aqueous solution to dryness by gentle heat, and treat the residue with alcohol of the specific gravity 0.843, which will leave undissolved a brown residue still containing hæmatin in combination. Filter the alcoholic solution, and distill it till what remains becomes of the consistence of a syrup. This syrup being mixed with some water, crystals begin immediately to be deposited. Leave it for twenty-four hours to evaporate spontaneously, then decant the liquid portion from off the crystals and wash them with a little alcohol. The decanted liquid being left to spontaneous evaporation will yield more crystals, and finally there remains a thick uncrystallizable liquid. If we evaporate this liquid to dryness, macerate the dry residue in cold water and evaporate afresh, more crystals are obtained, which may be purified like the others by washing them in alcohol. They are of a scarlet color, and have considerable luster. Under the microscope they assume the appearance of needles arranged in sphericles. A glass coated with hæmatin appears orange by transmitted, and white by reflected light. At first hæmatin is tasteless, but is succeeded by a slight bitterness, acridity, and astringency; it is slightly soluble in water, soluble in alcohol or ether. Acids render its solution red or yellowish; alkalies purple or violet; gelatin causes a flocculent purple precipitate.—*T.* Its constitution is $C_{20} H_{17} O_{15}$.

Properties and Uses.—Logwood is a tonic and unirritating astringent, and is useful in hemorrhages from the uterus, lungs, and bowels, in old diarrheas and dysenteries, in summer-complaint of children, and in night-sweats. A favorite preparation with many practitioners in cholera-infantum, after a proper employment of the Syrup of Rhubarb and Potassa, is the following: Dissolve two drachms of extract of logwood in four fluidounces of boiling water, to this solution add two fluidrachms of ammoniated tincture of opium, three fluidrachms of tincture of catechu, one fluidrachm of compound spirits of lavender, and four fluidounces of simple syrup, or syrup of ginger. The dose is a teaspoonful every three or four hours. In constitutions broken down by disease, dissipation, or the excessive use of mercury, the decoction of logwood, used freely in connection with the other treatment, will be found highly beneficial. Dose of the decoction, from two to four fluidounces; of the extract, five to thirty grains. The use of logwood imparts a blood-red color to the stools and the urine. It should never be combined with chalk or lime-water, as they are *incompatibles.*

A good red ink may be made as follows: Take of Pernambuco wood, a

Brazilian wood said to be derived from *Cœsalpina Echinata*, four ounces, dilute acetic acid, distilled water, of each sixteen ounces; boil together, until twenty-four ounces remain. Then add an ounce of alum, evaporate the liquid to sixteen ounces, dissolve an ounce of gum Arabic in it, strain, and to the cold liquid add a drachm of protochloride of tin. This ink is preferable to the cochineal ink, being free from its bluish tint, and more permanent.

Off. Prep.—Decoctum Hæmatoxyli; Extractum Hæmatoxyli; Vinum Hæmatoxyli Compositum.

HÆMOSPASIS.

Hæmospastic Medication. Dry Cupping.

This is a powerful revulsive treatment. Any thing which draws the blood to a part may be said to act hæmospastically. Dry cupping does so; it not only draws the blood from internal parts to the surface, but likewise attracts morbid action, and thus affords relief. Common half-pint tumblers will answer for adults very well, in place of ordinary cupping-glasses. A piece of paper or cotton, rolled up and fired, and dropped into the tumbler, and allowed to burn a minute or two, fits the tumbler for application to the spot. One, two, or more may be applied, and repeated as often as may be desirable; they should remain until ready to fall off. Intermittent fever has been invariably cured by M. Condret, by applying eight or ten middle-sized cupping-glasses, on each side of the spinal column, from the neck downward, and allowing them to remain for about thirty or forty minutes. To be applied at the commencement of the cold stage. One to four applications effects the cure. Also useful in cases of difficult respiration from congestion of the lungs or mucous membrane of the bronchii, etc.

HÆMASTASIS is a term applied to the retention of venous blood in the extremities by ligature. Tie a handkerchief, or any suitable cord around the upper part of the arms, and the thighs, and then, by means of a piece of wood, twist or turn the cord sufficiently tight to check the circulation of the venous blood, but not the arterial, which may be known by the action of the pulse. In a short time the arms and legs will be much distended, and an amount of blood removed from the trunk and retained in the limbs, which the most heroic practitioner dare not remove by the lancet. If the subject faint, promptly loosen or remove the ligatures; if he be plethoric and of firm, vigorous constitution, he must be reduced by cathartics, diuretics, sudorifics, and be under the influence of gentle nauseants, at the time of the operation. This is found very useful in uterine hemorrhage, hemoptysis, and other hemorrhages, inflammations of the brain, lungs, bowels, etc., congestions, puerperal convulsions, and wherever it is deemed advisable to lessen the amount of blood in the head and trunk, without injuring the system.

HAMAMELIS VIRGINICA.

Witch-hazel.

Nat. Ord.—Hamamelaceæ. *Sex. Syst.*—Tetrandria Virginica.

THE BARK AND LEAVES.

Description.—This is an indigenous shrub, sometimes called *Winter-bloom*, *Snapping-hazlenut*, *Spotted Alder*, etc.; it consists of several crooked, branching trunks from the same root, from four to six inches in diameter, ten or twelve feet in height, and covered with a smooth gray bark. The *leaves* are on short petioles, alternate, oval or obovate, acuminate, obliquely subcordate at base, margin crenate-dentate, scabrous with minute elevated spots beneath, from three to five inches long, and two-thirds as wide. The *flowers* are yellow, on short pedicels, three or four together in an involucrate, axillary, subsessile glomerule. The *calyx* is small, and divided into four, thick, oval, downy segments, with an involucel of two or three bracts at base. *Petals* four, yellow, three-quarters of an inch long, linear, curled or twisted. *Sterile stamens* four, scale-like, opposite the petals, alternating with the four *fertile ones. Ovary ovate; styles* two, short; *stigmas* obtuse. *Capsule* or *pod* nut-like, two-celled, two-beaked, opening loculicidally from the top; the outer coat separating from the inner, which incloses the oblong, black seeds, but soon bursts elastically into two pieces.—*W.*—*G.*—*R.*

History.—This plant grows in nearly all parts of the United States, especially in damp woods, flowering from September to November, when the leaves are falling, and maturing its seeds the next summer. The bark and leaves are the parts used in medicine; they possess a degree of fragrance, and when chewed are at first somewhat bitter, very sensibly astringent, and then leave a pungent sweetish taste, which remains for a considerable time. Water extracts their virtues. No analysis has been made of them. The shoots are used as divining-rods to discover water and metals under ground, by certain adepts in the occult arts.

Properties and Uses.—Witch-hazel is tonic, astringent, and sedative. The decoction of the bark is very useful in hemoptysis, hematemesis, and other hemorrhages, as well as in diarrhea, dysentery, and excessive mucous discharges. It has been employed with advantage in incipient phthisis, in which it is supposed to unite anodyne influences with its others. Reputed to have been used by the Indians in swellings and tumors of a painful character, as well as in external inflammations, in the form of poultice. The decoction may be advantageously used as a wash or injection for sore-mouth, painful tumors, external inflammations, bowel complaints, prolapsus ani and uteri, leucorrhea, gleet, and ophthalmia. An ointment made with lard and a decoction of white oak bark, apple-tree bark, and Witch-hazel, has been found a valuable application to piles. The following forms a useful preparation:—Take equal parts of Witch-hazel bark, golden-seal, and lobelia leaves, the first two made into a strong decoction, after which add the lobelia to the hot liquid, and cover; when cold, strain. With this decoction as a collyrium, I have succeeded in curing the most obstinate and long-standing cases of ophthalmia, as have many other practitioners to whom I have named it. Dose of decoction, from two to four fluidounces, three or four times a day.

Off. Prep.—Decoctum Hamamelis.

HEDEOMA PULEGIOIDES.

Pennyroyal.

Nat Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE HERB.

Description.—This is an indigenous annual plant, sometimes called *Tick-weed*, *Squaw-mint*, etc. It has a fibrous, yellowish *root*, and an erect, branching, pubescent, rather angular *stem*, from six to twelve inches high. The *leaves* are half an inch or more long, opposite, oblong, one or two teeth on each side, smooth above, rough below, narrowed at base, on short petioles; *floral leaves* similar. The *flowers* are quite small, light blue, in six-flowered axillary whorls. *Calyx* ovoid or tubular; gibbous on the lower side near the base, with thirteen striæ; upper lip three-toothed; lower two-cleft; throat hairy. *Corolla* with the tube as long as the calyx, downy, two-lipped; upper lip erect, flat, notched at the apex; the lower spreading, three-cleft, the lobes nearly equal. *Stamens* two, ascending, filiform; cells of the *anthers* diverging. *Seeds* four, oblong.—*W.*—*G.*—*L.*

History.—This herb was placed by Linnæus in the genus *Melissa*, and afterward *Cunila*, from which it was removed by Persoon, and placed in the genus *Hedeoma.* It must not be confounded with the Mentha Pulegium, or *European Pennyroyal.* It is a well-known plant, growing in barren woods and dry fields, and particularly in limestone countries, flowering from June to September and October, rendering the air fragrant for some distance around it. It is common to nearly all parts of the United States. It has a peculiar aromatic odor, which, however, is very offensive to some persons, and a hot, pungent, aromatic taste. It imparts its virtues to boiling water by infusion; boiling destroys its activity by evaporating the volatile oil, on which its properties depend. The oil may be obtained by distillation with water, and is often employed, or its tincture, instead of the herb itself; it is of a light-yellow color, and specific gravity, 0.948.

Properties and Uses.—Pennyroyal is a stimulant, diaphoretic, emmenagogue, and carminative. The warm infusion, used freely, will promote perspiration, restore suppressed lochia, and excite the menstrual discharge when recently checked; it is often used by females for this last purpose, a large draught being taken at bed-time, the feet having been previously bathed in warm water. A gill of brewer's yeast added to the draught is reputed a safe and certain abortive. The warm infusion may likewise be employed with advantage in the flatulent colic of children. The oil, or its tincture, is also administered as a carminative and anti-emetic, and has been of benefit in hysteria, hooping-cough, spasms, etc. It is likewise used as a rubefacient in rheumatism, and united with linseed oil, as an application to burns. Dose of the oil, from two to ten drops.

Off. Prep.—Decoctum Hedeomæ; Oleum Hedeomæ.

HEDERA HELIX.

Ivy.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND BERRIES.

Description.—This is an evergreen creeper, with long and flexible *stems* and *branches*, which attach themselves to the earth, or trees, or walls, by numerous root-like fibers. The *leaves* are coriaceous, smooth, shining, dark-green, with white veins, petiolate, the lower ones five-angled or five-lobed, the upper or old ones ovate and acute. The *flowers* are greenish-white, and are disposed in numerous, simple and downy umbels, forming a corymb. The *berries* black, with a mealy pulp.—*W.*—*L.*

History.—This plant is common all over Europe, and is cultivated in many parts of the United States; it flowers in September. The leaves and berries are the parts used. The former possess a peculiar, rather fragrant odor, and a nauseously-bitter and astringent taste. The taste of the latter is somewhat acid, piquant, and terebenthine. Vandamme and Chevallier discovered a bitter principle in the seeds, somewhat analogous to quinia in its antiperiodic powers, and which they named *hederia* or *hederin*. It is alkaline, and may be procured by the action of hydrate of lime upon the seeds, which precipitates the alkali; this is to be dissolved in boiling alcohol, filtered while hot, and evaporated.—*Am. Jour. Pharm. XIII., p.* 172.

Properties and Uses.—The *leaves* are stimulating, and have been employed as an application to issues; and have likewise been efficacious in diseases of the skin, indolent ulcers, salt rheum, itch, etc., in the form of decoction, and applied locally; this will also destroy vermin in the hair, which, it is stated, is stained black by the application. They are reputed beneficial as a cataplasm in glandular enlargements. Marasmus of children, rachitis, and pulmonary affections have been benefited by the dried leaves in powder, in doses of twenty grains or more. The berries act as an emetic and cathartic, and were formerly esteemed in febrile affections; having been supposed to possess sudorific virtues. Associated with vinegar, they were considerably used during the London plague.

HELENIUM AUTUMNALE.

Sneezewort.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—This plant, likewise called *Swamp*, or *False Sunflower*, is an indigenous, perennial herb, having a fibrous root, and several erect, branching, angular *stems*, two or three feet high, and strongly winged by the decurrent leaves. The *leaves* are alternate, smooth, or slightly pubescent, elliptic-lanceolate, more or less deeply serrate, often sprinkled with bitter and aromatic resinous globules. The *flowers* are large, numerous, bright-yellow, terminal in loose, showy corymbs, with flat, drooping, wedge-shaped rays, each ending in three obtuse teeth, and longer than the large, globose disk. *Involucre* small, reflexed, the scales linear or subulate. *Receptacle* globose or oblong, naked in the disk, and chaffy in the ray only. *Achenia* top-shaped, ribbed. *Pappus* of five thin and one-nerved chaffy scales, the nerve extending into a bristle or point.—*G.*—*W.*

History.—Sneezewort is a plant common to the United States, growing in low, damp fields and meadows, and on alluvial river banks, flowering from August to October. It is nearly inodorous, with a rather acrimonious, amarous taste. It has not been analyzed.

Properties and Uses.—Tonic, diaphoretic, and errhine. Valuable in chills and fever and other febrile diseases. The whole plant possesses errhine properties; but the flowers, particularly the florets of the disk, are the most active, and may be used, in powder, as a snuff in headache, catarrh, deafness, and other affections where errhines are desired.

HELIANTHEMUM CANADENSE. (*Cistus Canadensis.*)

Frostweed.

Nat. Ord.—Cistaceæ. *Sex. Syst.*—Polyandria Monogynia.

THE HERB.

Description.—This plant is also known by the names of *Rock-rose*, *Frost-plant*, etc. It is a perennial herb, with a simple, ascending downy *stem*, about a foot high, at length shrubby at base. The *leaves* are alternate, from eight to twelve lines long, and about one-fourth as wide, oblong, acute, lanceolate, erect, entire, subsessile, tomentose beneath, and without stipules. The *flowers* are large and bright-yellow, few, in terminal corymbs; *apetalous ones* smaller, lateral, solitary or racemose, clustered in the axils of the leaves, nearly sessile. *Corolla* of the petaliferous flowers an inch wide, with five petals, crumpled in the bud, fugacious. *Calyx* of the large flowers hairy-pubescent, five; of the small, hoary. *Stamens* of the large flowers numerous, declinate; of the small flowers, few. *Style* short or none. *Stigmas* three-lobed, scarcely distinct; *capsule* smooth, shining, triangular, three-valved, one-celled, opening at top, about three lines long; of the apetalous flowers not larger than a pin's head; *seeds* angular, few, brown. The yellow flowers open in sunshine, and cast their petals by the next day. —*G.*—*W.*

History.—This plant grows throughout the United States in dry, sandy soils, and flowering from May to July. The whole plant is officinal. The leaves and stems of the plant are covered with a white down, and Prof. Eaton, in his work on botany, says: "In November and December of 1816, I saw hundreds of these plants sending out broad, thin, curved, ice crystals, about an inch in breadth, from near the roots. These were melted away by day, and renewed every morning for more than twenty-five days in succession." The plant has a bitterish, astringent, slightly aromatic taste, and yields its properties to hot water.

Properties and Uses.—This plant has long been used in practice as a valuable remedy for scrofula, in which disease it has effected some astonishing cures. It is used in the form of decoction, syrup, or fluid extract; if taken in too large doses it will sometimes vomit. It is tonic and astringent, as well as antiscrofulous. In secondary syphilis, either alone, or in combination with Corydalis Formosa, and Stillingia, it forms a most valuable remedy. The decoction may be employed with advantage in diarrhea, as a gargle in scarlatina and aphthous ulcerations, as a wash in scrofulous ophthalmia, prurigo and other cutaneous diseases. Externally, a poultice of the leaves is applied to scrofulous tumors and ulcers. The fluid extract is the best form for internal use; dose, one or two fluidrachms three or four times a day. A physician in the West writes to me that he procures an oil from this plant, which he finds valuable in cancerous affections; how he prepares it is not stated. The *H. Corymbosum* or Frost-weed, with an erect, branching, canescent *stem;* lance-oblong, alternate *leaves*, canescently tomentose beneath; the *flowers* in crowded, fastigiate cymes; the primary ones on elongated, filiform pedicels, and with *petals* twice longer than the calyx; *sepals* villous-canescent, *outer ones* linear, obtuse; *inner ones* ovate, acute; is found growing in pine-barrens and sterile sands, in the Southern and Middle States. It possesses properties analogous to the preceding, and may be indiscriminately employed with it.

Off Prep.—Decoctum Helianthemi.

HELIANTHUS ANNUUS.

Sunflower.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

THE SEEDS.

Description.—This is an annual plant, with an erect, rough *stem*, usually about seven feet high, but which under favorable circumstances, attains the height of fifteen and even twenty feet. The *leaves* are large, cordate, three-nerved, the upper alternate, the lower opposite. *Peduncles* thickening upward. *Flowers* large, nodding; *rays* yellow; *disk* dark-purple. *Seeds* numerous, dark-purple when ripe. A splendid variety occurs with the flowers *all* radiate.—*W.*

History.—This well known plant is a native of South America, and is extensively cultivated in the gardens of this country, on account of its beautiful, brilliant, yellow flowers, which appear in July and August. The ripe seeds are the parts used, they are of a purplish color externally, about four or five lines long, between two and three wide, two-angled, margins parallel, apex somewhat pointed, the base truncate, compressed, with longitudinal convex surfaces, so as nearly to present four angles; internally the testa is whitish, and the kernel is whitish, oily, rather sweetish, and edible. They contain a fixed oil which may be obtained by expression. The leaves are large, and when carefully dried, may be made into segars, very much resembling in flavor that of mild Spanish ones. The virtue of the seeds chiefly depends upon the fixed oil they contain.

Properties and Uses.—Sunflower seeds and leaves, are diuretic and expectorant, and have been used in pulmonary affections with considerable benefit. The following preparation has been of much efficacy in bronchial and laryngeal affections, and even in the cough of phthisis; it acts as a mild expectorant and diuretic: Take of Sunflower seeds, bruised, two pounds, water five gallons; boil the two together until but three gallons of liquid remain, then strain, add twelve pounds of sugar, and one and a half gallons of good Holland gin. The dose of this is from two fluidrachms to two fluidounces, three or four times a day, or whenever tickling or irritation of the throat, or cough is excessive, or when expectoration is difficult. Various agents may be added to this preparation, according to indications, as tincture of stillingia, tincture of balsam of Tolu, tincture of iodine, etc. An infusion of the pith of Sunflower stem is diuretic, and may be used where this class of agents is indicated, also in many febrile and inflammatory forms of disease; it likewise makes a good local application in some forms of acute ophthalmia. The pith contains nitre, and has been recommended for the making of moxa; the quantity of nitre, however, varies, depending entirely upon the locality and character of soil in which the plant grows. The oil obtained from the seeds by expression, has been employed with benefit in cough, in dysentery, in inflammation of the mucous coat of the bladder, and in disease of the kidneys. To be given in doses of from ten to fifteen drops, two or three times a day. A teaspoonful of the oil taken at one dose, has produced active diuresis for four consecutive days, accompanied toward the termination with pain and debility in the lumbar region. The leaves are astringent.

HELLEBORUS NIGER.

Black Hellebore.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE ROOT.

Description.—Black Hellebore has a black, perennial, tuberculated, horizontal, scaly *root* or *rhizoma*, whitish internally, and sending off numerous, long, fleshy, brownish-yellow fibers, which become darker upon drying. The *leaves* are large, radical, on cylindrical stalks from four to eight inches long, pedate, of a deep green color above, paler and strongly reticulated beneath; the *leaflets* are five or more, one terminal, cuneate-obovate, entire and unequal at the base, coarsely serrated near the point. The *scape* is shorter than the petiole, one or two-flowered, with ovate, lacerated bracts immediately beneath the calyx, five or ten inches high. The *flowers* are large, rose-like; the *calyx* consists of five large, ovate or roundish, spreading *sepals*, at first white, then rose-red, and eventually becoming green. The *petals* are yellowish-green, tubular, shorter than the stamens, narrowed to the base; *stamens* numerous; *anthers* yellow; *capsules* leathery; *seeds* many, arranged in two rows, elliptical, umbilicated, black, glossy.—*L.*

History.—Black Hellebore inhabits the subalpine woodland regions in the middle and southern parts of Europe, flowering between December and February; it is also called *Christmas Rose.* It is not the Melampodium of the ancients, so celebrated in mental diseases, which is now shown to be a distinct species, the *Helleborus Orientalis,* and which probably possesses similar medicinal virtues, as well as the roots of some other species of the same genus.

The officinal parts are the radicles or root fibers, which are generally met with the rhizome attached. It is a many-headed root, with a caudex or body seldom over half an inch in thickness, and several inches long, horizontal, sometimes contorted, uneven, knotty, with transverse ridges, slightly striated longitudinally, its upper surface having the remains of the leaf and flower-stalks, and thickly beset upon the sides and undersurface with fibers, which, when uninjured, are from three inches to a foot in length, two or three lines in diameter, dark brownish-black externally, whitish within, spongy, not woody, brittle, with a feeble odor, and a faint, bitter taste.—*C.* When fresh they are said to be very acrid and nauseous, occasioning, when chewed for a short time, a pungent, numb sensation, resembling that which accompanies the eating or drinking of any thing hot. Desiccation, as well as age, gradually lessens this acridity. Its properties are taken up by water or alcohol; long continued heat diminishes its activity. According to the analysis of Feneulle and Capron, Black Hellebore root contains volatile oil, fatty oil, volatile acid, resinous matter, wax, bitter principle, ulmin, gallate of potassa, and ammoniacal salts.—*P.* Its acridity is supposed to depend on the volatile acid, while its purgative qualities are attributed to the resinous substance, from the fact that alcohol extracts the medicinal virtues of the fibers most completely. Mr. Wm. Bastick obtained a substance for which he has proposed the name of *helleborine;* it forms in white translucent crystals, is slightly soluble in water, more so in ether, and readily soluble in alcohol; it has a bitter, tingling taste, is decomposed by sulphuric acid, dissolved by nitric acid, and is neutral. He obtained it by diluting a strong tincture of the root, filtered, with water, and heating it for some time to expel the alcohol. The aqueous solution was then filtered to remove the separated resin, and afterward further evaporated, when some helleborine crystallized out of the solution; to purify them, he treated the solution with excess of carbonate of potassa, agitated it with three or four times its volume of ether, which extracted the helleborine almost in a state of purity.—*Pharm. Jour. and Trans. XII.*, 274.

Properties and Uses.—In large doses a powerful poison, causing gastro-intestinal inflammation, dizziness, painful spasms, severe emesis, catharsis, convulsions, and even death. The recent root produces rubefaction, and sometimes blisters, when held in contact with the skin. In medicinal doses, a drastic cathartic, diuretic, anthelmintic and emmenagogue. Formerly used in palsy, insanity, apoplexy, dropsy, epilepsy, etc., but seldom used at present; occasionally it is found useful in chlorosis, amenorrhea, etc. Dose of the powder, from five to ten grains; of the tincture, from one to two fluidrachms; of the extract, from two to five grains.

The *Helleborus Fœtidus* or Bear's foot, possesses similar properties, but is scarcely known in this country. It has been used in asthma, hysteria, and for the removal of tapeworm, in powder or decoction.

Off. Prep.—Vinum Hæmatoxyli Compositum.

HELONIAS DIOICA.—(*Chamælirium Luteum.—Wi.*)

Helonias.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Hexandria Trigynia.

THE ROOT.

Description.—This plant, also known by the names of *False Unicorn root*, *Drooping Starwort*, *Devil's Bit*, etc., is the *Vetratrum Luteum* of Linnæus, and the *Melanthium Dioicum* of Walter. It is a herbaceous perennial, with a large, somewhat bulbous, premorse *root*, from which arises a simple, very smooth, somewhat angular *stem* or *scape*, one or two feet in height. The *cauline leaves* are lanceolate, acute, small, and at some distance from each other, without petioles; the *radical leaves* are broader, being from four to eight inches in length, by half an inch to an inch in width, narrow at base, and formed into a sort of whorl at the base of the scape. The *flowers* are small, very numerous, greenish-white, and are disposed in long, terminal, spicate, nodding, diœcious racemes, resembling a plume, and which are more slender and weak on the barren plants. *Male flowers* with white, linear-spathulate, obtuse, one-nerved petals; *stamens* rather longer than the petals; *filaments* subulate; *anthers* terminal, two-lobed; *ovaries* wanting. *Female flowers*, the raceme is generally few flowered, becoming erect; *petals* linear; *stamens* very short, abortive; *ovary* ovate, subtriangular, with the sides deeply furrowed; *stigmas* three, spreading or reflexed. *Capsule* ovate-oblong, tapering to the base, three-furrowed, opening at the summit. *Seeds* many in each cell, acute, compressed.—*T.*—*L.*—*Wi.*

History.—This plant is indigenous to the United States, and is abundant in some of the Western States, growing in woodlands, meadows and moist situations, and flowering in June and July. It is also found in low grounds from Canada to Georgia and Louisiana. The plant is sometimes mistaken for the *Aletris Farinosa*, but may be identified by the leaves of the *Aletris* being sharply pointed, with a straight slender spike of scattered flowers, while the *Helonias* is not so sharply lance-shaped in its leaves, and has a thick plumose dioical spike.

The root is the officinal part; it is tapering, fibrous, about an inch and a quarter in length, and from two to six-eighths of an inch in diameter, very hard, transversely wrinkled, and abrupt or premorse at the end, appearing as though it had been cut or bitten off. There has been, and still exists much difficulty among druggists and herb-gatherers in determining the difference between the roots of Aletris Farinosa and Helonias Dioica; it has often been the case that these roots have been indiscriminately bought and sold. The specimens of Helonias which I have before me are from half an inch to two inches in length, and from four to six or eight lines in diameter, mostly premorse, but occasionally somewhat pointed, with many small, yellowish-white, thread-like fibers, from half an inch to two or three inches in length; externally, they are dark-brown, transversely wrinkled, rough and uneven, with annular prominences which often have the appearance as if a small root had been driven into the end of a larger one and grew there; there are also many small openings, cups, pores, or raised cells, through which pass the fibers, and which will always be seen at the base of each fiber upon carefully removing it from the root; attached to the upper part of the root, will frequently be seen the remains of the scape and radical leaves. Internally, on cutting them transversely, a whitish, rough, circular center is presented, which is surrounded with a smooth substance of a similar or darker color, and near the margin of which may be observed, at short distances from each other, dark spots or openings, which appear to be continuations of the fibers, or of the canals through which they pass; a longitudinal section exhibits a rough, whitish center, one or two lines in diameter, passing through the root, on each side of which is the smooth substance above referred to, with few or none of the dark spots. The roots have a faint, peculiar, unpleasant odor when bruised, and a peculiar bitter, somewhat aloetic taste, not so powerful in the dried ones as in the fresh. As far as I can recollect, the root of the Aletris seldom exceeds an inch in length, is not premorse, has a brittle, scaly appearance, is blackish outside, brownish inside, and although having many fibers, the most of them pass from the upper and lateral portions of the root.

Properties and Uses.—Helonias is tonic, diuretic, and vermifuge; in large doses, emetic, and when fresh, sialagogue. In doses of ten or fifteen grains of the powdered root, repeated three or four times a day, it has been found very beneficial in dyspepsia, loss of appetite, and for the removal of worms. It is reputed beneficial in colic, and in atony of the generative organs. In uterine diseases it is held to be invaluable, acting as a uterine tonic, and gradually removing abnormal conditions, while at the same time it imparts tone and vigor to the reproductive organs. Hence, it is much used in leucorrhea, amenorrhea, dysmenorrhea, and to remove the tendency to repeated and successive miscarriages. The plant is said to kill cattle feeding on it; and the decoction to kill insects, bugs, and lice. Dose of the powder, from twenty to forty grains; of the decoction, from two to four fluidounces; of the hydro-alcoholic extract from two to four or five grains. The *Helonias Bullata*, with purple flowers, and probably some other species, possesses similar medicinal virtues.

HEMIDESMUS INDICUS.

Indian Sarsaparilla.

Nat. Ord.—Asclepidaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This is a climbing plant with a long and slender *root*, with few ramifications, covered with rust-colored bark, and with twining, diffuse or climbing, woody, slender *stems*, from the thickness of a crow's quill to that of a goose's, and nearly smooth. The *leaves* are opposite, on short petioles, entire, smooth, shining, and of firm texture; they vary much in shape and size, those on the young shoots that issue from old roots, being linear, acute, and striated down the middle with white; while the others are generally broad-lanceolate, and sometimes ovate or oval. The *stipules* are four-fold, small, on each side of each petiole, caducous. The *flowers* are small, externally green, internally a deep-purple, and are disposed in axillary, sessile racemes, which are imbricated with flowers, and then with scales like bracts. The *calyx* is five-cleft, with acute divisions: the *corolla* is flat, rotate, with oblong, pointed divisions, rugose inside. The *follicles* are long, slender, and spreading.—*L.*—*Ro.*

History.—This plant is the *Periploca Indica* of Willdenow, and the *Asclepias Pseudosarsa* of Roxburgh; it is common all over the peninsula of India. It has long been used as a medicine in India, but was not known to the medical profession of this country and Europe, until its introduction by Dr. Ashburner in 1831 (*Lond. Med. and Phys. Journal, LXV.* 1089.) Its root is long, tortuous, cylindrical, rugous, furrowed longitudinally, and has its cortex divided by transverse fissures into moniliform rings. It is brownish externally, and has a peculiar aromatic odor, somewhat like that of sassafras, but which has been compared to that of new hay, and a feeble, bitter taste. The cortical portion has a corky consistence, and surrounds a ligneous meditullium. Mr. Garden obtained from it a volatile, crystallizable acid, on which the taste, smell, and probably the medicinal properties depend. From an erroneous notion of the origin of the root, he called the acid the *smilasperic acid*, but it may with more propriety be termed *hemidesmic acid* or *hemidesmin.* —*P.*

Properties and Uses.—Indian Sarsaparilla has been successfully employed in venereal diseases, especially in cases where the South American Sarsaparilla has proved inefficacious. Dr. Ashburner says that it increases the appetite, acts as a diuretic, and improves the general health; "plumpness, clearness, and strength, succeeding to emaciation, muddiness and debility. Likewise said to be useful in affections of the kidneys, scrofula, cutaneous diseases, and thrush. Notwithstanding these statements it is by no means so efficacious and certain as many of our indigenous remedies. It is used in the form of infusion, as boiling dissipates its active volatile principle; two ounces of the root may be infused in a pint of boiling water for an hour; the whole of which may be taken in the course of twenty-four hours."

HEPATICA AMERICANA.

Kidney Liverleaf.

HEPATICA ACUTILOBA.

Heart Liverleaf.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE PLANT.

Description.—Hepatica Americana of De Candolle, is the Hepatica Triloba of Willdenow. This is a perennial plant, the root of which consists of numerous and strong fibers. The *leaves* are all radical, on long, hairy petioles, with three ovate obtuse or rounded, entire lobes, smooth, evergreen, coriaceous, cordate at base, the new ones appearing later than the flowers. The *flowers* appear almost as soon as the snow leaves the ground in spring; they are single, generally blue, sometimes white and flesh-color, are nodding at first, then erect, and on hairy scapes, three or four inches long; by cultivation they become double. *Involucre* simple, composed of three entire, ovate, obtuse bracts, resembling a calyx, situated a little below the flower. *Calyx* of two or three rows of petaloid sepals; *stamens* awl-shaped; *anthers* elliptic; *achenia* ovate, acute, awnless.—*W.*—*G.* HEPATICA ACUTILOBA differs in having the *leaves* with three ovate and pointed lobes, or sometimes five lobed; *leaves of the involucre* acute or acutish.—*G.*

History.—This has been viewed as the only species of this genus, the differences observed as to color, form, etc., being looked upon as fortuitous. De Candolle, however, divides it into two species, as above described. These plants are common to the United States, growing in woods and upon elevated situations; the *H. Americana*, which is the most common, being found, as Eaton states, on the side of hills exposed to the north, and the other on that facing the south. They both bear white, blue, or purplish flowers which appear late in March or early in April. The entire plant is employed; it is odorless, and has a subastringent and viscid taste, and yields its virtues to water. The name *Liverwort* sometimes erroneously applied to it, belongs to the cryptogam *Marchantia Polymorpha*, and others of the same family.

Properties and Uses.—A mild mucilaginous astringent. It has been used in infusion, taken freely in fevers, hepatic complaints, bleeding from the lungs, coughs, etc., but in severe cases it is unavailable. The infusion may be taked *ad libitum.*

HERACLEUM LANATUM.

Masterwort.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant, sometimes called *Cow-parsnep*, has a large, spindle-shaped, perennial *root*, with a strong, disagreeable smell, from which arises a hollow, thick, furrowed, branching and pubescent *stem*, from three to five feet high, and often an inch or more in width at the base. The *leaves* are very large, on downy, channeled petioles, and ternately compound; the leaflets roundish-cordate, unequally lobed; the lobes acuminate, almost glabrous above, and woolly underneath. The *flowers* are white, and are disposed in huge umbels, often a foot broad, with deciduous involucres. *Involucels* long-pointed, lanceolate, many leaved. *Calyx* limb of five, small, acute teeth. *Petals* obcordate, with the point inflexed, the outer larger and radiant, appearing deeply two-cleft. *Fruit* compressed, oval, with a broad, flat margin, and three obtuse dorsal ribs to each carpel; intervals with single *vittæ; seeds* flat.—*G.*—*W.*—*R.*

History.—Found growing in moist meadows and cultivated grounds from Labrador to Pennsylvania, and west to Oregon, flowering in June. The root is the part used; is somewhat analogous to parsley in appearance, has a strong, peculiar, unpleasant odor, and an ill-flavored, acrimonious taste. The recent root and leaves when placed in contact with the skin irritate and inflame it; and that which inhabits very damp localities is considered poisonous.—*B.*

Properties and Uses.—Stimulant, antispasmodic and carminative. Used in flatulency and dyspepsia, in decoction; and two or three drachms of the powdered root, taken daily in epilepsy, and continued for some time, with a strong infusion of the leaves and tops at night, has been found successful. Recommended, also, in asthma, colic, amenorrhea, dysmenorrhea, palsy, apoplexy, intermittents, etc., in doses of one drachm.

HEUCHERA AMERICANA.

Alum Root.

Nat. Ord.—Saxifragaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant, sometimes called *American Sanicle*, is herbaceous and indigenous, with a perennial, knotty, yellowish *root.* The *leaves* are all radical, on very long downy petioles from two to eight inches in length, roundish-cordate, hispidly pilose, about seven-lobed; and from two to three and a half inches in diameter; the lobes are short and roundish, crenate-dentate, with dilated mucronate teeth. Many *scapes* or *flower stems* arise from the same root, from two to four feet high, erect, naked, viscid-pubescent in their upper part, and terminating in loose, pyramidal, forked *panicles*, which are nearly one-third the length of the scape. The *calyx* is permanent, five-cleft, campanulate, small, obovate, striated, with very obtuse segments, and more conspicuous than the petals. The *petals* are purplish-white, or rose-colored, minute, spathulate, and inserted into the margin of the calyx, between its segments. The *filaments* are twice as long as the petals, yellowish, inserted opposite the segments of the calyx, persistent, and surmounted by small, red, globose anthers. *Capsule* ovate. *Seeds* minute, oblong, black, very hispid.—*L.*—*W.*—*R.*

History.—This plant is a native of North America, and is found in shady, rocky woodlands, from Connecticut to Illinois and southward, flowering from May to August. The root is the part used; it is perennial, yellowish, horizontal, somewhat flattened, rough and unequal, with an intensely astringent taste. It yields its medicinal virtues to water. No analysis has been made of this plant. There are several species of this plant, the *Heuchera Caulescens*, *H. Pubescens*, and others which possess similar properties, and are often collected and sold with the roots of H. Americana.

Properties and Uses.—Alum Root, as its name would indicate, is a powerful astringent, so intensely so, as seldom to be administered internally; yet it would undoubtedly prove useful in small doses, in all cases where astringents are indicated. An aqueous extract will be found very beneficial in diarrhea and dysentery in the second stages, in hemorrhages, and other similar diseases. Externally, the powdered root may be applied to hemorrhages, epistaxis, wounds, foul and indolent ulcers, etc. The decoction is useful in aphthous sore-mouth, and soreness of the throat and fauces; it may be used as a wash or gargle. Taken internally, in doses of a wineglass half-full three or four times a day, it has been efficacious in diabetes, and in bleeding piles, employing it, in this last complaint, by injection also. Equal parts of Alum Root and black-cohosh root in decoction, form an excellent local application in leucorrhea and excoriation of the cervix uteri. Some practitioners employ this root indiscriminately with that of the *Geranium Maculatum;* it is, however, more powerfully astringent, and probably a preparation, equal at least to *geraniin* in medical virtue might be obtained from it.

HIERACIUM VENOSUM.

Hawkweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT AND LEAVES.

Description.—This plant, also known as *Veinyleaved Hawkweed*, *Rattlesnakeweed*, *Striped Bloodwort*, etc., has a perennial root, with a *stem* or *scape* from one to two feet in height, dark-brown, slender, sometimes naked, sometimes with one or more glabrous cauline leaves, forking above several times into a spreading loose corymb, with an awl-shaped bract at each division. The *radical leaves* are obovate or oblong, somewhat acute, nearly entire, subsessile, thin and pale, purplish and glaucous underneath, a little hairy above, often hairy along the midrib, marked with purple veins, and the first that unfold are close upon the ground. *Heads* very small, in a loose panicle on slender diverging peduncles, twelve to twenty flowered; *involucre* glabrous, hispid at base; *flowers* bright yellow; *achenia* short, linear, not tapering at the summit.—*G.*—*W.*

History.—Hawkweed grows in many parts of the United States, but more commonly in the East and North, upon dry hills and in pine woods. It bears yellow flowers from May to July. The leaves and roots are employed; they are inodorous, with a viscid, amarous taste; they have not been analyzed. Water extracts their virtues.

Properties and Uses.—This plant is tonic, astringent, and expectorant; it has been used in scrofula, menorrhagia, hemoptysis, and other hemorrhages, in decoction. The powdered leaves and root have been used as a snuff in polypus of the nose, combined with bloodroot. Said to be efficient against the bites of poisonous snakes. The juice of the fresh leaves is recommended as a cure for warts. Dose of the infusion or syrup, from two to four fluidounces.

HIRUDO MEDICINALIS.

The Leech.

Description.—The Leech belongs to the class of *Vermes*, in the Zoological arrangement, and order *Annulata.* The class is characterized by a more or less elongated *body;* soft *skin*, segmented and annulated; *arti-*

culated members and *wings* absent, and *blood* red. The general zoological characters of the order, are: "*Jaws* with two rows of pointed, numerous *teeth*, which are mutually inclined at an acute angle."—(*Brandt.*)

"*Body* elongated. *Back* convex. *Belly* flat. *Extremities* somewhat narrowed, furnished with disks or suckers; the anterior extremity somewhat narrower than the posterior one. *Rings* from ninety to a hundred. *Eyes* represented by ten blackish points. *Mouth* triradiate. *Jaws* cartilaginous, armed with numerous cutting teeth. *Anus* small, placed on the dorsum of the last ring."—*P.*

Two species of Leeches are recognized in commerce, the *Hirudo officinalis*, and the *H. medicinalis*, though some excellent zoologists consider them to be only varieties of the same species. "Both have a soft extensile body composed of about ninety-eight rings. They vary in length from an inch and a half to six inches when in repose, but can contract themselves to a third of their length, and stretch themselves out to nearly the double of it. They present along the back and flanks six continuous or interrupted stripes of a rusty or greenish-yellow color, by which they are easily distinguished from all other species that resemble them. They can attach themselves by both ends to adjacent objects by means of a particular apparatus. The *H. Medicinalis* is distinguished by a dark-brown or greenish-brown back, with rusty stripes generally spotted with black, and a grayish or yellowish belly, also more or less speckled with black spots. The *H. Officinalis* has a paler, greenish-black back, less bright and unspotted stripes, often interrupted and intercommunicating, and a paler, more yellowish, or greenish unspotted belly. The former, commonly called the English Leech, is a native of Britain, Germany, Poland, Sweden, Northern France, and European Russia. The latter usually known as the Hungary Leech, is a native of that country, and likewise of the south of France. Both species have three converging mandibles, furnished at their edge with minute, sharp teeth, from 69 to 71 in number in each jaw in the Hungary Leech, and from 79 to 90 in the other. By means of these teeth, when the skin is sucked into the mouth, it is pierced with a sawing motion, so as to present three incisions meeting in a common center. These incisions often penetrate through the whole thickness of the integuments into the cellular tissue. The animal becomes filled with blood in the course of fifteen minutes, if it be vigorous, and draws about a drachm and a half."—*Christison.* The American Leech, *Hirudo decora*, is frequently used in this country, though it does not draw as much blood, by one-third, as the foreign Leech. It has a back of a dark-green color, and having three rows of quadrangular dots running lengthwise; the central row being pale brownish-yellow, and the others quite black. The abdomen is also pale brownish-yellow, and interspersed with dark spots. It is ordinarily about three inches long, and occasionally longer.

History.—There is considerable difficulty in preserving Leeches, especially on a large scale, as they often die suddenly and in great numbers, Various means have been adopted to keep them healthy. The most common cause of their sickness and death is the formation of a slimy matter on their skin, and which they are in the habit of removing by drawing themselves through moss and small stones. Dr. Johnson names certain diseases as a cause of their death, and Brostat describes three epidemic disorders. Leeches are more liable to disease and mortality, when kept together in large quantities, than when preserved in small numbers. They should be kept in glass or earthen-ware jars, in clean rain or soft water, which should be changed every day or two, and at the bottom of which is placed some loose moss, pebbles, etc., for them to move among. "It is stated that the presence of metallic iron in water prevents it from becoming putrid. This influence is said to be very marked in water in which Leeches are preserved, and renders the changing of the water unnecessary for very long periods. The slimy excretion of the animals appears to combine with the oxide of iron which is constantly being formed." The jar in which the animals are kept should be covered with a thin cloth, and placed in a locality where the temperature is equable. A dead Leech should be at once removed, and fresh water be immediately supplied to the remaining ones. M. Allchin has prepared a Leech conservatory, in which the Leeches were kept in a healthy state, and the water clear and sweet, without changing the water for ten or twelve months. It consists of a glass tank with a movable glass cover, and arrangement for admitting air through a perforated metallic plate. Some coarse gravel is placed at the bottom of the tank, which is about half filled with water, and into it are put one plant of valisneria, ten water snails, *Planorbis corneus*, and about one hundred Leeches. A permanent balance of animal and vegetable life is thus maintained, and no necessity occurs for changing the water.

It has been tried to propagate Leeches in confinement, but, in all these cases, after a few years, there remained only those which were placed in the water, and those just hatched. This depopulation of the artificial ponds in which they were kept has been attributed, by Dr. Berard, to the "enemies of the Leech," or those animals which devour them, among which he names the pig, the otter, the mole, the hedgehog, the rat, water-shrew mice, teal, ducks, heron, fowls, serpents, toads, fresh-water shrimp, and other crustaceæ. The goose, aquatic toad, water lizard, and frog, he does not consider enemies of the Leech. If these statements are found to be correct, they will aid materially in determining the best plan by which to preserve and propagate Leeches artificially.

Properties and Uses.—Leeches are occasionally used as a substitute for general blood-letting among children and delicate adults, or when it is required to abstract blood from some part whose locality or sensitiveness contra-indicates the lancet or cupping. They are also very beneficial when applied with care to hemorrhoidal tumors, prolapsed rectum, inflamed vulva, etc.. watching that they do not creep out of reach within any of the internal cavities of the body, as serious results might ensue. Salt is a speedy poison to the Leech, and whenever one gets within the stomach, or other cavity beyond reach, the introduction of a strong solution of salt will destroy it. They are more commonly used in local inflammations, bruises, etc. In applying them, any hair growing on the part must be removed by shaving, and the part must be thoroughly cleansed by soap and water, followed by clear water. Should the Leech not fasten quickly, various means have been advised to overcome this difficulty, as moistening the part with warm milk and water, or with a drop of blood, or by immersing the Leech for a moment in porter. It has also been recommended to hold the Leech in a dry cloth, direct its head to the selected part, and slowly withdraw it along the skin, thus forcing it to take hold in order to find a firm attachment. But it must be recollected that there are certain states of the body, in which the Leech will not attach itself, or speedily perish if it does. In poisoning by nux vomica, strychnia, oxalic acid, etc., and where sulphur has been used, the Leech dies if it abstracts blood. In order to hold Leeches to any particular part of the body, they are placed in a narrow tube called a Leech-glass, which confines them to one spot.

When it is desired to remove Leeches from the skin, this may be accomplished readily by dropping a little salt upon them, which sickens them. The usual mode is to draw the Leech gently through the thumb and index finger, in a direction from its tail to its head, thus forcing out the blood, and then place the animal in clean water, to remain there for several days before employing it again, frequently renewing the water. Souberain and Bouchardat recommend as the best plan, first, to sicken the Leech by placing it in a solution of eight parts of salt to fifty of water, then, holding it by the tail, to dip it into hot water, but which can be borne by the hand, and then to strip it by gently passing it between the fingers; the Leech is then to be placed in fresh water, which should be changed every day. A little white sugar dissolved in the water, will, it is said, speedily restore them to their original activity. When the hemorrhage from Leech-bites is troublesome, or too long continued, it may be checked by applying tannic acid or other astringents, collodion, eau de Pagliari, or by a very superficial stitch with a fine sewing-needle.

HORDEUM DISTICHON.

Barley.

Nat Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

THE DECORTICATED SEEDS.

Description.—There are several kinds of Barley, the more general ones being the following: HORDEUM VULGARE has an erect, smooth, fistular *culm* or *stem*, from two to four feet in height, with alternate, carinate, lanceolate, linear and roughish *leaves;* the *sheaths* auriculate at the throat. The *flowers* are all hermaphrodite and awned; *spikes* thick, about three inches long; *spikelets* three, all fertile, one-flowered, with an awn-like rudiment at the base of the upper palea. *Glumes* two, subulate, nearly equal, awned. *Paleæ* two, herbaceous; the lower one lance-ovate, concave, long awned; the upper obtusely acuminate, bicarinate. *Stamens* three; *ovary* hairy at the apex. *Stigmas* two, sessile, somewhat terminal, feathery. *Scales* two, ciliated. *Caryopsis* adhering to the paleæ. The *fruit* or *seeds* in four rows.—*L.*—*W.*

Hordeum Distichon differs from the preceding by having a compressed spike or ear, with the lateral spikelets abortive and awnless; the spikelets on the edge only being fertile, and the fruit is disposed in two rows.

History.—Barley is thought to be a native of Central Asia, but the subject is involved in much uncertainty. The seeds are officinal; they are oblong-ovoid, with a furrow on one side running lengthwise, yellow outside, white internally, of a feeble odor, and a moderately-saccharine taste. When the seeds are stripped of their husks, and made round by a particular process, it constitutes *Pearl Barley* (*Hordeum Perlatum*), which is the best form for use; when this is ground into a coarse flour it forms Barley-meal. Barley-meal contains no hordein, but, according to Einhof, starch 67.18, fibrous matter 7.29, gum 4.52, sugar 5.21, gluten 3.52, albumen, 1.15, phosphate of lime, moisture, etc., 11.03.—*Ed.*

When the entire grain is moistened and exposed in mass to a summer temperature until it begins to germinate, and is then devitalized by a stronger heat, it is called *malt*, which is extensively employed in making ale, beer and porter. During the process of making malt, much carbonic acid is given off, oxygen being, no doubt, absorbed; the azotized matter in the seeds has undergone a change, and has acquired the properties of diastase; and the starch has in part disappeared, its place being supplied by grape-sugar and dextrine.

Barley seeds consist of 65.43 starch, 13.96 azotized substances, 10. dextrine, 2.76 fatty matters, 4.75 cellulose, and 3.10 of silica, and several salts.—*Payen.*

Hordein is a principle found in Barley by Proust; it may be procured by boiling the starchy matter which is obtained by kneading Barley-meal in a cloth with water; the undissolved residuum, when well washed with boiling water, is *hordein.* It is a yellowish, granular powder, like sawdust, yielding oxalic acid when treated with nitric acid, and consisting, according to Marcet, of 12 equivalents of carbon, 11 of hydrogen, and 10 of oxygen. M. Guibort and Dr. Thomson consider it to be the amylin or tegumentary membrane of the starch globules, which are stronger and more solid in Barley starch than in other kinds. Barley is insoluble in alcohol, ether, or the fixed and volatile oils; but alcohol or ether removes from it a little resin. Boiling water dissolves a large proportion of it. A peculiar proximate principle has been found in Barley seeds subsequent to the germinating process, by MM. Payen and Persoz, which they have named *diastase*, on account of its effect in detaching the principles of the starch-globules from one another. During the process of germination, the rupture of the starch-globules, and the separation of their tegumentary amylin from the contained amidin, is the first change effected, and which is succeeded by conversion of the amidin into sugar and dextrine, which changes are owing to this principle, which is developed at the time in the seed. The same substance has likewise been found in the seeds of oats and wheat, and in the potato, but only after these have undergone germination.—*C.*

Diastase may be applied to various useful economical purposes. According to Thomson, it may be obtained by "macerating ground malt for some time in about half its weight of cold water. The whole is then subjected to pressure, and the liquid which flows out is to be filtered and then heated to the temperature of 158° F. This temperature is sufficient to coagulate and cause to separate the greatest part of an azotized matter, which exists in the liquid. The liquid being filtered again, is to be mixed with a sufficient quantity of alcohol to throw down the *diastase*, while the sugar, coloring matter, and the residue of the azotized substance, remain in solution. To obtain the diastase pure, it should be again dissolved in water, and thrown down by alcohol, and this ought to be repeated two several times. Diastase thus obtained is solid, white, amorphous, insoluble in alcohol, but soluble in water and dilute alcohol. Its aqueous solution possesses neither acid nor alkaline qualities, and has little taste." Diastase, after purification, is best obtained in the dry state by exposing it in thin layers to a current of air at about 110° F. Its aqueous solution is not precipitated, like that of starch, by lime, baryta, or diacetate of lead; on keeping it becomes acid. Its most remarkable property is that of converting starch and water, at a temperature of about 160°, into sugar and dextrine. It has no action upon either gum or sugar, and yet one part of it added to two thousand parts of starch suspended in water, causes the starch-globules speedily to burst, the teguments separating from the contained amidin, which, by the prolonged action of the above heat, effects this extraordinary conversion without any perceptible difference in the weight of the substances employed.

The different kinds of beer, ale and porter, are made from malt, with the addition of hops and other articles. Malt has a sweetish, mucilaginous, rather agreeable taste; an infusion of it at 160° completes the conversion of the starch into sugar and gum; yeast being then added at a temperature between 60° and 80°, vinous fermentation takes place, carbonic acid is disengaged and alcohol formed. The sugar is the source of the alcohol existing in malt liquors, while the gum or dextrine is the cause of their viscidity, and the permanence of their effervescence and frothy top.

Properties and Uses.—Pearl Barley in decoction is a nutritive and demulcent, and on account of its mild and unirritating qualities is much used as an article of diet for the sick and convalescent, acting at the same time, if the Barley itself be swallowed, as a gentle aperient. The decoction is employed for suspending powdered drugs insoluble in water, and also as a drink in febrile diseases, catarrh, dysentery, inflammation of the bladder, gonorrhea, and chronic mucous inflammations. Combined with hops, or in the form of beer, ale, or porter, it forms a valuable tonic in many chronic exhausting diseases, and in convalescence. From two to four ounces of malt boiled in a quart of water, afford a more demulcent and nutritious liquor than Barley, and is consequently better adapted to cases requiring a sustaining course of treatment. In making the decoction of Barley, two ounces must first be washed with cold water, and all extraneous matters removed; then place the Barley in half a pint of water, boil for a short time, strain off the water, and throw it away, as this is only employed to remove mustiness, or any disagreeable flavor which the Barley may have acquired. To the Barley thus prepared, add four pints of boiling water, boil down to two pints and strain. The decoction may have other articles added in the course of its preparation, varied to suit the taste of the patient, as sugar, sliced figs, raisins, liquorice root, etc. It may be drank freely.

Off. Prep.—Decoctum Hordei.

HUMULUS LUPULUS.

Hops.

Nat. Ord.—Urticaceæ. *Sex. Syst.*—Diœcia Pentandria.

THE STROBILES OR CONES.

Description.—This plant has a perennial *root*, with many annual, angular *stems*, rough backward, with minute reflexed hairs, and twining around surrounding objects in a volute direction with the sun, and climbing to a great height. The *leaves* are opposite, on long winding rough petioles; the smaller ones cordate, the larger from three to five-lobed; all are deep green, serrated, veiny, and very rough. The *flowering branches* are axillary, angular and rough. The *stipules* are two or four, between the petioles, smooth, ovate, reflexed. The *flowers* are numerous, axillary, and of a greenish color. The male flowers are very numerous, panicled and yellowish-white; *sepals* five, oblong, obtuse, spreading, concave; *stamens* short; *anthers* oblong, opening by two terminal pores. The female flowers are pale-green, and grow on a separate plant in the form of an ament, having each pair of flowers supported by a bract, which is ovate, acute, and tubular at the base; *sepals* solitary, obtuse, smaller than the bracts, and enfolding the ovary; *ovary* roundish, compressed; *stigmas* two, long, subulate, downy. The bracts enlarge into a persistent catkin or strobile, each bract inclosing a nut enveloped in its permanent bractlet, and some yellow resinous grains.—*L.*—*B.*

History.—This plant is common in hedges and thickets in many parts of Europe, and grows spontaneously in various sections of the United States; said also to inhabit China and the Canary Islands. It is largely cultivated for its cones or strobiles which are used medicinally, and in the manufacture of beer, ale, porter, etc. A few layers of the barren vines planted among the fertile ones, are said to be profitable by increasing the weight of the produce. The strobiles or cones are the parts employed; these are collected when thoroughly matured, properly desiccated, and then placed in large bags or pockets, and sold as *Hops*. They consist of ovate, membranous, semitransparent, light-green scales, tinged more or less of a yellow color, which are glandular at their base, near which they develop two minute, globular, hard nuts or achenia of a bay-brown color, and which are covered with aromatic, superficial, globose, golden-yellow glands or grains called *lupulin*. The odor of Hops is peculiar and somewhat agreeable, and their taste slightly astringent and exceedingly bitter. They yield their virtues to boiling water, which, however, are impaired by a long continued heat. The decoction turns litmus paper red, becomes deep-green with the salts of iron, and turbid with the solution of isinglass. A better solvent than water is diluted alcohol.

The active properties of Hops are owing to the lupulin above referred to, although the scales possess them in an inferior degree. *Lupulin* (*Lupulina*) is procured by beating or rubbing the strobiles, and then sifting out the grains, which form about one-seventh part of the Hops. Lupulin is in globose, kidney-shaped grains, of a cellular texture, golden-yellow, and somewhat transparent. The common center around which the cells are arranged, has been called the hilum. Each grain consists of two vesicles, one inclosing the other. The inner one contains globules, an aromatic oil, and gas, in the bubbles of which numerous crystals are said to be formed. Lupulin has the odor and taste common to the Hop; a gentle heat renders it tenacious; exposed to flame it burns. Unless carefully dried it soon loses its properties, which, indeed, under all circumstances are impaired by keeping. It is always preferable to the Hop for officinal purposes. According to Payen, Chevalier, and Pelletian's analysis, lupulin consists of volatile oil 2.00, lupulite 10.30, resin 50 to 55.00, lignin 32.00; besides traces of various fatty, astringent, gummy, acidulous, and saline matters. Dr. Ives found it to contain tannic acid 4.16, bitter principle 9.16, extractive 8.33, wax 10.00, resin 30.00, lignin 38.33. Its virtues undoubtedly depend upon its volatile oil and bitter extract, which are taken up by alcohol. The volatile oil is procured by placing the lupulin in water, and distilling. It is yellowish, acrid, soluble in water, alcohol, or ether, and has the specific gravity 0.910. By triturating lupulin with ether, and then allowing the ether to evaporate, a useful, somewhat narcotic, and in large doses, exhilarating ethereal oil is obtained.

Lupulite is the name given to the bitter principle of Hops; it is obtained by making an aqueous solution of lupulin; saturating this with lime to remove the tannic and malic acid present, filtering, evaporating the liquid to dryness, and digesting the residuum in ether, which dissolves a little resin. The undissolved portion is now treated with alcohol which dissolves the lupulite, and which may be obtained by filtration and evaporation. It is sometimes nearly white, and sometimes of an orange-yellow color, being opaque in the former instance and transparent in the latter. It is without odor, except when heated, in which case the Hop odor is developed; it is bitter, uncrystallizable, soluble in alcohol, in twenty parts of boiling water, nearly insoluble in ether, neutral, contains no nitrogen, and is said to impair the appetite and digestive powers. The dilute acids and alkalies have no action on it, nor is it altered by solutions of the metallic salts.—*T.*—*P.*

Properties and Uses.—Hops are tonic, hypnotic, febrifuge, antilithic, and anthelmintic. Their tonic and anthelmintic properties are small, and probably depend upon their bitterness; they possess no antiperiodic virtues. Sometimes they cause diuresis, and are said to correct lithic acid deposits. They are principally used for their sedative or hypnotic action—producing sleep, removing restlessness, and abating pain, but which they often fail to accomplish. A pillow stuffed with Hops has long been a popular remedy for procuring sleep. The lupulin or its tincture is used in delirium tremens, and watchfulness in connection with nervous irritation, anxiety or exhaustion; it does not disorder the stomach nor cause constipation, as with opium. Also useful in after-pains, to prevent chordee, suppress venereal desires, and allay the pain attendant on gonorrheal disease. Externally, in the form of a fomentation alone, or combined with boneset, or other bitter herbs, Hops have proved beneficial in pneumonia, pleurisy, gastritis, enteritis, also as an application to painful swellings or tumors. An ointment made by boiling two parts of stramonium leaves and one of Hops, in lard, has proved an effectual application in salt-rheum, ulcers, and painful tumors. The dose of lupulin is from six to ten grains, and which may be given in powder, or in pill made by merely rubbing it in a warm mortar till it acquires a pilular consistence. The tincture of lupulin may be given in doses of from one to four fluidrachms. The decoction of Hops is seldom employed. Ale, porter, and beer are frequently administered in cases of debility in the absence of inflammatory symptoms, as tonic, stimulant, and nutritive agents. The ethereal tincture of lupulin forms what is termed the ethereal oil of lupulin, by allowing the ether to spontaneously evaporate. It produces at first a stimulant influence, succeeded by a very agreeable, calming sensation, and has been used with advantage in some cases of nervous irritability where opium and other narcotics failed. It does not, however, appear to possess any narcotic properties. A mixture of oil of chamomile one fluidrachm, and ethereal oil of lupulin one fluidrachm and a half, dissolved in sulphuric ether half a fluidounce, has been found beneficial in dysmenorrhea, and other painful uterine diseases, in doses of from thirty to sixty drops, every three or four hours.

Off. Prep.—Extractum Lupulinæ; Infusum Humuli; Tinctura Lupulinæ; Unguentum Humuli.

HYDRANGEA ARBORESCENS.

Hydrangea.

Nat. Ord.—Saxifragaceæ. *Sex. Syst.*—Decandria Digynia.

THE ROOT.

Description.—This plant, sometimes called *Seven-barks*, *Wild Hydrangea*, etc., is the *Hydrangea Vulgaris* of Michaux and Pursh. It is an indigenous shrub, smooth or nearly so, attaining the height of five or six feet, with opposite, petiolate *leaves*, which are ovate, obtuse at base, rarely cordate, acuminate, serrate-dentate, nearly smooth, and green on both sides. The *flowers* are often all fertile, numerous, small, white, becoming roseate, and disposed in fastigiate cymes. *Calyx tube* hemispherical, eight or ten ribbed, coherent with the ovary; the *limb* four or five toothed, persistent; *petals* ovate, sessile; *stamens* eight or ten, slender; *capsule* crowned with the two divergent styles, two-celled below, opening by a foramen between the styles; *seeds* numerous.—*W.*—*G.*

History.—This elegant shrub grows abundantly in the Southern, Middle, and Western States, in mountains and hills, and on rocks and near streams. The bark is rough, peeling off—each layer being of a different color, and which has probably given origin to the name "Seven-barks." It is quite common in the Susquehanna and Schuylkill valleys, and its flowers are often met with in bouquets in the markets of Philadelphia. The root is the part that has been employed; it is formed of numerous radicles, sometimes not larger than a goosequill, and again half an inch or more in diameter, and of considerable length. These proceed from a caudex which sends upward numerous divergent branches. When fresh, the root and stalks are very succulent, containing much water, and can easily be cut; and the root likewise contains a great deal of mucilage, with albumen and starch. When dry they are very tough and resistent, and exceedingly difficult to bruise or cut, hence they should be bruised while fresh, or which is better, cut into short transverse sections, which facilitates the drying. The bark of the dried root has a rather pungent, aromatic, not disagreeable taste, somewhat similar to that of cascarilla bark. The stalks contain a pith which is easily removed, and they are used in some parts of the country for pipe-stems. Mr. Joseph Laidley, of Richmond, Va., found the root to contain gum, albumen, starch, resin, soda, lime, potassa, magnesia, sulphuric and phosphoric acids, and a protosalt of iron.

Properties and Uses.—This plant was introduced to the profession by Dr. S. W. Butler, of Burlington, N. J., as a remedy for the removal of calculus or gravelly deposits in the bladder, and for relieving the excruciating pain attendant on the passage of a calculus through the ureter; and from the reports made, it certainly deserves a full and thorough investigation. The power of curing stone in the bladder is not claimed for it; it is only while the deposits are small, when in that form of the disease known as gravel, that it is an efficient remedy; then by removing the nucleus, which, if allowed to remain in the organ, would increase in size and form stone, the disease is averted, and when employed at this stage, it is said to have proved beneficial in every instance, and as many as 120 calculi have been known to come from one person under the use of this remedy. The effect of the plant, Dr. Butler states, is to remove by its own specific action on the bladder, such deposits as may be contained in that viscus, provided they are small enough to pass through the urethra. The mode of using it, is to prepare a concentrated syrup of it with sugar or honey, and give a teaspoonful three times a day; or a simple decoction of the root may be taken freely. If taken in over-doses it will produce some unpleasant symptoms, as dizziness of the head, oppression of the chest, etc. The leaves of Hydrangea, are said by Dr. Eoff to be tonic, sialagogue, cathartic, and diuretic. The fluid extract of Hydrangea is principally used in the earthy deposits, as phosphates of lime, ammonia and magnesia; in alkaline urine; and in chronic gleet, and mucous irritations of the bladder in aged persons.

HYDRASTIS CANADENSIS.

Golden-seal.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE ROOT.

Description.—This is an indigenous plant, which is also known by the various names of *Yellow Puccoon*, *Ground Raspberry*, *Turmeric Root*, etc.; it has a perennial *root* or *rhizoma*, which is tortuous, knotty, creeping, internally of a bright-yellow color, with numerous long fibers. The *stem* is erect, simple, herbaceous, rounded, pubescent upward, from six to twelve inches in height, becoming purplish, and bearing two unequal terminal leaves. The *leaves* are two only, alternate, palmate, with from three to five lobes, hairy, dark-green, cordate at base, veiny, the lower leaf petiolate, the other sessile, from four to nine inches wide when full grown, and the segments serrated. The *flower* is solitary, terminal, small, white or rose-colored, and on a peduncle about two inches in length. The *calyx* consists of three petaloid, deciduous, broadly-ovate, pale greenish-white, concave, slightly downy sepals, which fall away when the flower opens. *Stamens* many, longer than the pistils. *Filaments* flat linear-lanceolate, having the cells of the anther on their edge at the apex. *Pistils* several; *ovary* oval, glabrous, attenuated upward into a short style. *Stigma* obtuse, scarcely lobed. The *fruit* resembles a raspberry, is red, and consists of many little two-seeded drupes collected into a globose head, and each crowned with the persistent style; *seeds* nearly black, obovate, polished, having a minute embryo at the base of a fleshy and oily albumen.—*L.*—*W.*—*G.*

History.—This plant is found growing in shady woods, in rich soil and damp meadows, in different parts of the United States and Canada, but is more abundant west of the Alleghanies. It flowers in May and June. The root is the officinal part; it consists of a crooked, knotty, wrinkled rootstock, one or two inches long, giving off a number of yellow fibers; the root is of a beautiful yellow color, and when fresh is juicy, and used by the Indians to color their clothing, etc. It loses about two-thirds of its weight by drying. The recent root has a peculiar heavy odor, which diminishes by drying, and its taste is very amarous. Its virtues are imparted to water or alcohol. According to Mr. A. B. Durand, of Philadelphia, it consists of resin, starch, albumen, sugar, fatty matter, yellow coloring matter, several salts, and a crystallizable body, which he named *hydrastin.*—*Am. Jour. Pharm. XXIII.*, 13. The root of Hydrastis furnishes a beautiful yellow color, which would, undoubtedly, form a valuable dye for silk, linen, etc.; a fine green is made by combining it with indigo.

Properties and Uses—This root is a powerful tonic, at the same time exerting an especial influence upon mucous surfaces and tissues with which it comes in contact. Internally, it is successfully administered in dyspepsia, chronic affections of the mucous coats of the stomach, erysipelas, remittent, intermittent, and typhoid fevers, torpor of the liver, and wherever tonics are required. In conjunction with geraniin it forms a very efficient remedy in chronic diarrhea and dysentery. In some instances it proves laxative, but without any astringency; and seems to rank in therapeutical action between rhubarb and bloodroot. Externally, and as a topical application, the decoction or tincture proves a superior remedy in all chronic mucous inflammations. In some cases of opacity of the cornea, as well as in other forms of ophthalmic disease, I have found the following preparation more efficacious than the usual caustic solutions: Mix together two parts of decoction of hydrastis, and one of the saturated tincture of aralia spinosa, and apply to the eye with a camel's hair pencil, two or three times a day. The decoction of Hydrastis to be made by evaporating a strong decoction of the root to the consistence of mucilage or syrup. It has been used in ophthalmic diseases, with much success in the following form: Tincture capsicum two fluidrachms, tincture Hydrastis three fluidrachms, olive-oil two fluidounces; shake well together each time before using, and apply with camel's hair pencil. A strong decoction of two parts of Hydrastis, and one of geranium maculatum, is very valuable in gleet, chronic gonorrhea, and leucorrhea, used in injection; it is likewise of much benefit in *incipient stricture*, *spermatorrhea*, and *inflammation* and *ulceration of the internal coat of the bladder.* Ulceration of the internal coat of the bladder has been cured by the decoction of Hydrastis alone. It must be injected into the bladder, and held there as long as the patient can conveniently retain it—to be repeated three or four times a day, immediately after emptying the bladder. Combined with Caulophyllum, in strong decoction, and sweetened with honey, it is a superior remedy in all ulcerations of the mouth and fauces, both as a gargle or wash, and taken internally. The peculiar action of this agent on mucous tissues, I noticed some sixteen years ago, since which I have successfully continued its use in inflammation and ulceration of the bladder, diseases of the eye, dyspepsia, etc. Several persons to whom I made known its value in these diseases, have also used it with a success similar to my own. When taken in very large doses, I have known the decoction of Golden-seal to produce excessive secretion from the mucous surfaces of the mouth and nose, so much so that the secretions were removed by the patients in long, tenacious shreds or pieces. Dose of the powder from ten to thirty grains; of the tincture from one to two fluidrachms; of the hydro-alcoholic extract, from two to five grains.

Off. Prep.—Decoctum Hydrastis; Extractum Hydrastis Hydro-alcoholicum; Lotio Hydrastis Composita; Tinctura Hydrastis; Tinctura Hydrastis Composita; Vinum Hydrastis Compositum.

HYDRASTIN.

Hydrastin.

THE ACTIVE PRINCIPLE OF HYDRASTIS CANADENSIS.

Preparation.—Take of the root of Hydrastis Canadensis, in coarse powder, *one hundred pounds*, and add of Alcohol a sufficient quantity to form a tincture by percolation; and distill off the alcohol; the residuum, which is of a thick, syrupy consistence, must be warmed, and poured into eight gallons of Hot Water, which will take up the Hydrastin, with a portion of gum, extractive, and some coloring matter. Let it stand for two or three days, and then decant into a precipitating tub, and add of Muriatic Acid *five pounds*. This causes a precipitate, which, when perfected, must be collected on a linen or cotton cloth placed over a tub for the purpose, and washed well by pouring clean water upon it. When it has thoroughly drained, place it into a tin boiler, and add of Animal Charcoal *three pounds*, and Alcohol, *six or eight gallons;* place this over a strong heat, and stir constantly till it is all dissolved, bringing the liquid to the boiling point; then set it aside, and as it cools the crystals will form on the sides of the boiler and through the alcohol, and will continue to form for two or three days. The liquid and crystals must then be placed on a cloth, as before, being careful not to dip up the charcoal which is in the bottom of the vessel, and wash the crystals with cold alcohol, after which spread them on a cloth or paper, and dry in the open air, or by moderate heat, if necessary. If they are not of the proper color, redissolve them in alcohol with animal charcoal, and proceed as at first. For the purpose of obtaining any remaining Hydrastin, the alcohol in which it crystallizes may be distilled and carried through the same process as at first; and the mother-water may be treated with Ammonia, and the precipitate purified in the same manner as at first.

The following is Dr. A. R. Brown's process for obtaining Hydrastin: "Macerate *thirty pounds* of the roots of Golden-seal in *eight gallons* of Alcohol 76 per cent., for forty-eight hours; then, through a small opening made in the bottom of the vessel containing the above, allow the tincture to run off into a separate vessel; add of a new supply of alcohol *four gallons*, and after macerating for twenty-four hours, draw off as before. Now, pour upon the roots six gallons of cold water, and in twenty-four hours draw off the remaining alcohol, the water having been absorbed by the roots. Place these several tinctures together into a displacement apparatus sufficiently large for the purpose (I prefer Smith's), and distill off the alcohol. Remove the residue, and let it stand an hour or two; and then pour off the supernatant liquid very carefully, so as to leave behind a black oleo-resinous substance, which, if not removed, will injure the beautiful yellow color of the Hydrastin, and prevent it from being pulverizable. Now treat the liquid which has been poured off, with *six or eight gallons* of water, and while stirring the whole, gradually add of pure Muriatic Acid, *sixteen ounces;* let it stand ten or twelve hours, and filter through very fine muslin. Remove the Hydrastin and place it on unglazed dishes to facilitate its drying. As prepared by this process, one pound of the roots yields half an ounce of the so-called Hydrastin."

Prof. E. S. Wayne has obtained forty seven ounces of Hydrastin from one hundred and eighty-six pounds of the powdered root of Hydrastis, by the following method: Macerate and displace by cold water, then acidulate the infusion with hydrochloric acid, which precipitates Hydrastin and a gelatinous substance; collect the precipitate on a filter, and wash with clean water; then dry it, dissolve the dried mass in alcohol, filter, and set aside to crystallize.

History.—This elegant and highly valuable article was introduced to the profession by Dr. H. H. Hill, of the firm of F. D. Hill & Co., wholesale druggists in Cincinnati. I feel highly indebted to these gentlemen for the above description of the process employed by them for its manufacture, and would take this occasion to remark, that I regret the spirit of selfishness which prompts some manufacturers to withhold a knowledge of their mode of preparing concentrated articles; it is a species of empiricism which should never be countenanced by any physician. I never employ an article of any kind, unless its mode of preparation is known to the profession, and this course should be adopted by every practitioner, as one among the many means of elevating the profession, and securing the confidence of others, as well as of ourselves. It is but a short time, since I was presented with a concentrated agent obtained by precipitation with acetate of lead, and on an investigation I found some lead mixed with it, and which, had I administered without a knowledge of the process employed for obtaining it, and my consequent examination, might have caused serious results. In this instance the proper course had not been taken to free the article from the lead. The profession, therefore, can not be too uncompromising in refusing to administer agents, however valuable they may be, which are manufactured by secret processes, more especially as desperate means have been recently used by designing and interested parties to force upon the profession, secretly prepared agents of a most worthless character, and at most exorbitant prices.

Hydrastin prepared by the above process, forms in delicate, acicular crystals, of a yellow color and translucent. It exhibits neither acid nor alkaline reactions, and forms, when pulverized, a beautiful yellow powder. It is soluble in boiling alcohol, but is deposited as it cools in crystals. It is insoluble in cold alcohol, ether, chloroform, spirits of turpentine, and water, though each liquid becomes tinged more or less of a yellow color. It is rendered more soluble in alcohol, but not completely so, by ammonia, liquor potassa, or acetic acid, the last article making the solution of a lighter color. It dissolves to a greater extent in water by the addition of acetic acid, which changes the solution to a light-yellow color; ammonia or liquor potassa does not make it more soluble in water, and nitric acid changes the Hydrastin to a beautiful bright-yellow color, without solution—sulphuric acid to a chrome-yellow. Concentrated nitric acid turns Hydrastin red, and concentrated sulphuric acid swells or effervesces and changes it to a chrome-yellow color. Heat gradually changes the color to a brownish-red, and then black with effervescence. At its point of effervescence by the application of heat, it is inflammable if brought into contact with flame, burns quickly, and leaves a black, porous, shining substance behind.

Soluble preparations of the concentrated principles of many of our agents are always very desirable on account of the difference of therapeutic action existing between them and a decoction, infusion, or tincture of the crude articles; thus, a decoction of golden-seal exerts an influence in sore mouth, and several other affections, not to be obtained from the insoluble Hydrastin. These facts should be especially observed.

Properties and Uses.—Hydrastin is a tonic, with an especial action on diseased mucous tissues; it possesses, in an eminent degree, the tonic virtues of the root and is much used as a substitute for it. It is more beneficial as a tonic during convalescence from exhausting diseases, such as bilious and typhoid fever, acute hepatitis, gastritis, enteritis, diarrhea, dysentery, etc. In dyspepsia and chronic inflammation of the stomach it is very valuable, and will be found of especial advantage in the treatment of persons who are intemperate, gradually removing the abnormal condition of the stomach, and in many instances destroying the appetite for liquor—it may be combined in these cases with sulphate of quinia, extract of quassia, or other bitter tonic. In jaundice a combination of equal parts of Hydrastin, myricin, and xanthoxylin will often prove efficacious. Combined with quinia and leptandrin, it will be found useful in infantile remittent fever. One part of Hydrastin and two of fine salt, well triturated together, form an excellent powder for many ophthalmic diseases, to be blown into the eyes through a quill or small tube. Equal parts of Hydrastin, caulophyllin, and leptandrin form an excellent medicine for aphthæ and other ulcerations of the mouth and throat, in infants, as well as adults; it should be administered internally. A pill composed of one grain of Hydrastin, one-twentieth of a grain of alcoholic extract of nux-vomica, and sufficient ptelein to form a pill mass, is found an efficacious remedy for some forms of dyspepsia, and loss of appetite; one pill to be given for a dose, and repeated three times a day. Dose of Hydrastin, for an adult, from three to five grains; for children, from half a grain to three grains, and which may be repeated from three to six times a day, if required.

HYOSCYAMUS NIGER.

Henbane.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND SEEDS.

Description.—Henbane is a biennial plant, with a long, spindle-shaped, thick and corrugated *root*, of an internal whitish color, and externally brown. The *stem* is from six inches to two feet high, erect, taper, scarcely branched, covered closely with long weak hairs, tipped with a minute black gland. The *leaves* are large, oblong, acute, alternate, coarsely and unequally sinuated, occasionally somewhat decurrent, stem-clasping at the base, pale dull-green, slightly pubescent, with long glandular hairs upon the midrib. The *flowers* are numerous, axillary, subsolitary, nearly sessile, embosomed in the uppermost leaves, than which they are much shorter. The *corolla* is of a dull, dirty-yellow, strongly netted with purple veins, and deep-purple at the orifice, funnel-shaped, with a somewhat erect, five-lobed limb; the lobes are rounded, spreading, the two anterior a little smaller than the others, and separated at base by a deep slit in the tube. The *calyx* is villous, funnel-shaped, five-lobed, regular, wider than the corolla, to whose tube it is equal in length and persistent; each *lobe* ovate, acute, with an open æstivation. *Stamens* five, declinate, straight, shorter than the corolla, the three lower longer than the others; *filaments* pubescent, inserted about the middle of the tube of the corolla, inclined; *anthers* cordate, purple. The *ovary* is nearly round, shining, pale-green, two-celled, with numerous ovules, adhering to the dissepiment; *style* filiform, declinate, purple at the apex; *stigma* blunt, round, capitate. *Fruit* an ovate, two-celled capsule, opening transversely by a convex lid; *seeds* many, small, obovate, brownish.—*L.*—*B.* The whole plant has a disagreeable, fetid odor, and a repulsive appearance.

History.—Henbane is an European herb, naturalized in this country, growing in waste grounds and commons, and flowering from June to September. Botanists are divided as to whether it is an annual or biennial plant, as it is sometimes found to be the former. The biennial is the officinal plant, though we are not aware of any difference between the two as regards medical properties. All parts of the plant are medicinal, but the leaves and seeds are the parts usually employed; the former should be collected at the time of its flowering, and the latter when perfectly matured. The leaves of the second year's growth of the plant are reputed more active than those of the first year; when fresh they abound in a viscid juice, and when bruised have a nauseously-rank narcotic smell, and an acrid, oleaginous, disagreeable taste. Upon drying, the smell and taste are almost destroyed.

The leaves impart their properties to diluted alcohol; water, alcohol, ether, fixed or volatile oils also take up a portion of their virtues. The aqueous infusion is tasteless, light-yellow, and having the taste and odor of the plant. According to Morries, an empyreumatic oil may be obtained by the destructive distillation of Henbane; it is highly poisonous.—*Ed. Med. and Surg. Jour., XXXIX., p.* 379. The seeds are small, numerous, oval, obtuse, compressed, finely-dotted, of a yellowish-gray color, and having the same taste and odor as the leaves, but with oiliness. They contain fixed oil, fatty matter, gum, bassorin, starch, albumen, vegetable fiber, saline matters, with *hyoscyamia*, etc.

Hyoscyamia is the active principle of Henbane. Mr. Bastick prepares hyoscyamia as follows: macerate two pounds of bruised Hyoscyamus seeds in one gallon of alcohol (to which has been previously added three ounces of sulphuric acid), for forty-eight hours; drain the alcoholic solution from the seeds, and filter, and to the filtered liquid add powdered caustic lime, with continued agitation, until the fluid has an alkaline reaction. Again filter and saturate the filtrate with sulphuric acid in excess. Filter this acid solution, evaporate with gentle heat until it is reduced to about one fourth. To the residue add a little water, and again evaporate until all traces of alcohol have disappeared. Filter to remove the resin which has been precipitated by the water. Then carefully saturate the filtrate with a concentrated solution of carbonate of potassa, and if a precipitate ensues, the liquid must again be filtered. Mix the filtrate with a considerable excess of carbonate of potassa; treat the liquid with successive portions of ether by constant agitation until it no longer dissolves any thing thereout. By spontaneous evaporation of the ethereal solution, crystals of hyoscyamia are obtained; if coloring matter be present, these may be redissolved and acted on by animal charcoal. In the same manner may be prepared, aconitia, arnicina, daturia, and lobelina. A small quantity only is obtained of hyoscyamia; it crystallizes in tufts of transparent, silky needles, rather sparingly soluble in water, freely soluble in alcohol or ether, of an alkaline action upon vegetable colors, forms neutral and crystallizable salts with acids, volatile with little decomposition, if strongly heated alone, but readily decomposed with evolution of ammonia if boiled in contact with alkalies, precipitated from its solutions by tincture of galls, and possessing a nauseous, acrid, tobacco-like taste. Hyoscyamia is an active poison, as are its salts; a minute quantity of it placed within the eye, causes a persistent dilatation of the pupil. In its natural state of combination, this principle is very prone to decomposition under the influence of heat, and its destruction is always indicated by the escape of ammonia.

Properties and Uses.—Henbane is a powerful narcotic, and dangerously poisonous; it causes deranged vision, dilated pupils, giddiness, headache, loss of speech, coma, or furious delirium, sometimes convulsions, paralysis, nausea, vomiting, intestinal pain and purging, which frequently terminate fatally. Gastro-intestinal inflammation is found on dissection. Emetics and the stomach-pump, stimulants, galvanism and acids are the chief remedies in such cases. In medicinal doses, it is anodyne hypnotic, calmative, and antispasmodic; allaying pain, soothing excitability, inducing sleep, and arresting spasm. It does not produce constipation like opium, but has a tendency to act as a laxative. Usually given in cases where opium disagrees, or where constipation must be avoided; in neuralgic and all spasmodic affections, asthma, gout, rheumatism, chronic cough, irritations of the urinary organs, and inflammatory cases attended with nervous excitability and not with high fever. It may be combined with active cathartics, as scammony, colocynth, aloes, podophyllin, etc., for preventing tormina without impairing their energy. Its principal employment is to cause sleep, or remove irregular nervous action. Where the fresh leaves can be obtained, they are employed in fomentation, or bruised as an external application to allay the inflammatory and painful condition of ulcers and tumors, as well as to relieve nervous headache, and the pain in gouty, neuralgic, rheumatic, and similar affections. The leaves in infusion, or the extract dissolved in water, is used as a local application to the eye, before operating for cataract, in order to dilate the pupil, which it usually effects in three or four hours, without any subsequent injury to the eye. A liniment for glandular swellings may be made by mixing together, extract of Henbane one drachm, white soap four drachms, and linseed oil twelve fluidounces; to be applied two or three times a day with considerable friction. One part of the Hyoscyamia to twenty-four of water, forms a solution for a similar purpose, and of which one drop is to be placed on the eye. Dose of the powdered leaves from two to ten grains; of the tincture from thirty drops to two fluidrachms; and of the alcoholic extract, which is the only extract that should be used, from one-half of a grain to two grains, which may be increased cautiously to a scruple.

Off. Prep.—Extractum Hyoscyami Alcoholicum; Extractum Hyoscyami Fluidum; Tinctura Hyoscyami.

HYPERICUM PERFORATUM.

St. John's Wort.

Nat. Ord.—Hypericaceæ. *Sex. Syst.*—Polyandria Pentagynia.

THE TOPS AND FLOWERS.

Description.—This plant has a perennial, woody, tufted, fusiform, tortuous, somewhat creeping *root.* The *stem* is two-edged, branchiate, erect above, curved below, branched, and from one to two feet high. The *leaves* are very numerous, elliptical or ovate, obtuse, opposite, entire, marked with pellucid dots, of a pale green color, from six to ten lines long, and one third as wide, the ramial leaves being much smaller. The *flowers* are numerous, of a bright yellow color, and arranged in dense, forked, terminal panicles. The *calyx* is persistent; *sepals* five, acute, lanceolate, connected at base, with five dark-colored glands. *Petals* five, twice as long as the sepals, ovate, obtuse, yellow, dotted and streaked with black or dark-purple. The *stamens* are numerous, united at base, and divided into three sets, with small anthers. The *styles* are three, short, erect; *stigmas* small. *Capsule* roundish, three-celled, three-valved; *seeds* numerous, small, roundish. The whole herb is dark-green, with a powerful scent when rubbed, staining the fingers dark purple, from the great abundance of colored essential oil.—*L.*—*W.*

History.—St. John's Wort is an herb abundantly growing in this country and Europe, and proving exceedingly annoying to farmers. The flowers appear from June to August. It has a peculiar terebinthine odor, and a balsamic, bitterish, rather astringent taste. It contains a volatile oil, a resin, tannic acid, and coloring matter.—*Blair*, *Am. Jour. Pharm. II.*, 23. It imparts its properties to water, alcohol, ether, oils, or alkaline solutions.

Properties and Uses.—Astringent, sedative, and diuretic. Used in suppression of the urine, chronic urinary affections, in diarrhea, dysentery, worms, jaundice, menorrhagia, hysteria, nervous affections with depression, hemoptysis, and other hemorrhages. Externally, in fomentation, or used as an ointment for dispelling hard tumors, caked breasts, bruises, ecchymosis, swellings, ulcers, etc. The blossoms infused in sweet oil or bear's oil, by means of exposure to the sun, make a fine red balsamic ointment for wounds, ulcers, swellings, tumors, etc. A very excellent ointment for tumors, ecchymosed conditions, etc., may be made by adding to one pound of lard, half a pound of the recent tops and flowers of St. John's Wort, and half a pound of fresh stramonium leaves; bruise all together, expose to a gentle heat for an hour, and strain. Dose of the powder, from half a drachm to two drachms; of the infusion, from one to two fluidounces.

Off. Prep.—Infusum Hyperici.

HYSSOPUS OFFICINALIS.

Hyssop.

Nat. Ord.—Labiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE TOPS AND LEAVES.

Description.—Hyssop is a perennial herb; the *stems* are quadrangular, woody at base, spreading, very much branched, and a foot or two in height; branches rod-like. The *leaves* are opposite, sessile, usually oblong-linear, or lanceolate, sometimes elliptical, sometimes narrower, acute, entire, punctate, green on each side, rather thick, one-ribbed underneath. The *flowers* are bluish-purple, seldom white, and are in racemose, secund whorls; consisting of from six to fifteen flowers. *Floral leaves* like those of the stem but smaller. *Outer bracts* lanceolate-linear, acute, scarcely shorter than the calyx. The *upper lip of the corolla* erect, flat, emarginate; lower lip trifid, spreading, with the middle lobe larger. *Stamens* four, protruding, diverging; *anthers* with linear divaricating cells.—*L.*— *W.*

History.—Hyssop inhabits Europe and this country, being raised principally in gardens; it flowers in July. The tops and leaves are the officinal parts; their odor is pleasantly fragrant, and their taste hot, spicy and somewhat bitter, which properties are due to a volatile aromatic oil, which rises in distillation both with water and with alcohol. Water, by infusion, or alcohol, extracts its active virtues. Said to contain beside its yellow oil, some bitter principles and sulphur.

Properties and Uses.—Stimulant, aromatic, carminative and tonic. Principally used in quinsy and other sore-throats, as a gargle, combined with sage and alum, in infusion sweetened with honey. Also recommended in asthma, coughs, and other affections of the chest, as an expectorant. The leaves applied to bruises, speedily relieve the pain, and disperse every spot or mark from the part affected.

Off. Prep.—Infusum Hyssopi.

IBERIS AMARA.

Bitter Candytuft.

Nat. Ord.—Brassicaceæ. *Sex. Syst.*—Tetradynamia Siliculosa.

THE SEEDS.

Description.—This plant has a herbaceous *stem*, about a foot in height, with lanceolate, acute, somewhat toothed *leaves*, and white *flowers*, corymbed, but becoming racemed. *Silicles* obcordate, narrowly emarginate; *cells* one seeded.— *W.*

History.—This is a small annual, common to Europe, where it is admired as an ornamental plant; its beautiful white flowers appearing in June and July. The whole plant is reputed medicinal, the seeds more especially.

Properties and Uses.—In overdoses it occasions vertigo, vomiting and purging, without accomplishing any valuable result. Medicinally, it appears to control nervous and vascular excitement, and has been found efficacious in enlargement of the heart, and some affections of the air-tubes. It is also said to have been beneficially administered in rheumatic, gouty, and dropsical affections. The dose is from one to five grains of the powdered seeds.

ICHTHYOCOLLA.

Isinglass.

THE SOUNDS OR SWIMMING-BLADDER OF SEVERAL SPECIES OF ACIPENSER, ETC.

History.—Isinglass is an almost pure gelatin, being usually procured from the *air-bags*, *sounds*, or *swimming-bladders* of various fishes. These are membranous sacs placed under the spine, in the middle of the back, and above the center of gravity, and communicate in most fish with the stomach or œsophagus by the pneumatic duct; these sacs are filled with air, containing about eighty per cent. of oxygen, and are composed of a firm, silvery external coat, and two thin and delicate internal coats. The fresh sounds are removed from the fish, cut open, carefully washed, and then exposed to the air to dry; then, after being dampened to soften them, they are made into rolls about half an inch in diameter, and folded, between three pegs, into the shape of a horse-shoe, heart, or lyre (*long* and *short staple*), or folded in the manner bookbinders fold printed sheets of paper (*book-isinglass*). When the sound is rolled out, it is termed *ribbon* Isinglass. The internal membrane of the sounds is thin and insoluble. Sometimes Isinglass is reduced to small shreds, when it will be scarcely possible for the eye to distinguish the inferior from the finer kinds; the latter may be known by their whiteness, freedom from unpleasant fishy odor, solubility in water, and translucency of the jelly obtained on cooling from its hot solution. The above are the best forms, the book Isinglass is superior to any; an ounce of water will dissolve ten grains of it, giving hardly any insoluble matter, and furnishing an excellent jelly.

There are other kinds of an inferior character, as the *Cake Isinglass*, which is in cakes or round pieces, having an unpleasant smell and a tawny color, and which is principally used by artists. The *Samovey Isinglass* is prepared in Russia, from the *Silurus Glanis*, but it is not so pure as those named above. Isinglass is also made in the Eastern States in this country, from the sounds of the hake (*Gadus Merluccius*), and cod (*Morrhua Americana*), and other fishes; it is in long, flat pieces, known as *ribbon Isinglass*, is very pure, being almost wholly soluble in water, but its piscatory flavor is an objection to its use for domestic or pharmaceutical purposes. A very inferior Isinglass is prepared in Brazil, and in the East Indies.—*P.*—*Am. Jour. Pharm.*, *XVIII.*, 54.

When American Isinglass in solution is thinly spread on cotton cloth, previously oiled and dried, it forms a very pure article in clear, delicate laminæ, but having a piscatory smell, and is known as "transparent or refined Isinglass." Pure glue made from bone, is supposed to form "Cooper's Isinglass."

Isinglass is chiefly a very pure gelatin, the best kinds are white, translucent, glistening, odorless and tasteless; the poorer varieties are colored, opaque, and have either a fishy taste or smell. It is soluble in weak acidulous and alkaline liquids, and in water at 212° F., forming with the latter, when strained and cool, a pure animal jelly. It is not dissolved by alcohol, nor by water at 60° F., but with this latter it expands and becomes soft. Tannic acid added to its solution occasions a precipitate resembling leather. When boiled with potassa, or with concentrated mineral acids, it is decomposed, forming *sugar of gelatin* or *glycocoll*, $C_4 N H_5 O_4$, which is in large transparent crystals, very sweet, soluble in water, and forming beautifully crystallized salts with acids. It is very useful for scrofulous and consumptive patients. John found in the purest Isinglass 70 parts of gelatin, 16 osmazome, 2½ membrane insoluble in boiling water, 2½ free acid, 4 of salts of potassa and soda, and some of phosphate of lime, and 7 of water. Mr. Solly found in Bengal Isinglass from 86 to 92 parts of gelatin, and from 7 to 13 of albumen, with a small portion of osmazome, saline and earthy substances, and a trace of odorous oil.—*P.*

An excellent cement, called *Armenian* or *Diamond Cement*, is made with Isinglass, which is valuable to the chemist and pharmaceutist for mending glass, china and porcelain vessels, which are not exposed to heat and moisture. It is made by sprinkling water upon two drachms of Isinglass, allowing it to stand until softened, then adding as much proof-spirit as will rather more than cover it, and dissolving it with a moderate heat. Have previously prepared, a solution made by dissolving one drachm of gum mastic, in two or three fluidrachms of alcohol. Mix the two solutions, and stir in one drachm of gum ammoniacum, previously reduced to a fine powder, and rubbed down with a little water. Evaporate, if necessary, in a water-bath to a proper consistence. Keep the cement thus prepared in a vial. When required for use plunge the bottle in warm water, and keep it there until the cement becomes fluid; then apply it with a stick or small hard brush to the edges of the broken vessel, previously warmed. Compress the pieces firmly together until cold, taking care to make the contact perfect, and using a very thin layer of cement; when properly applied, the cement is almost, if not quite, as strong as the glass or china itself.

A cement for stoneware may be made by allowing gelatin to swell in cold water, the jelly warmed, and so much recently slaked lime added as is requisite to render the mass sufficiently thick for the purpose. A thin coating of this cement is spread while warm over the gently heated surfaces of fracture of the articles, and let dry under a strong pressure. What oozes out is removed directly with a moist rag.

Isinglass is sometimes kept in thin, very fine cuttings, in which form it is more readily dissolved by boiling water.

Properties and Uses.—Isinglass is seldom used in medicine except as a nutritive. It is used as a diet, in the form of jelly, or added to other jellies, to give them a tremulous appearance. I have used the following preparation in incontinence of urine, both in children and adults, in many instances, and have found it a useful as well as agreeable remedy, proving serviceable when other means had failed: Take of Isinglass (*long staple*) one roll; boil it in one pint of water till it is dissolved, then strain, add one pint of sweet milk, put it again over the fire, and remove it just as ebullition commences; then sweeten with loaf sugar, and grate nutmeg upon it. When made, it very much resembles custard. Of this, a tumblerful may be taken three or four times a day by an adult. Isinglass is employed in the arts for various purposes, for clarifying or fining wines, beer, coffee, syrups, etc., and is a constituent of court-plaster. Three drachms form a proper jelly with a pint of water.

IGNATIUS AMARA. (*Linn.*)

Bean of St. Ignatius.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE SEEDS.

Description.—Ignatius Amara, the *Strychnos Ignatii* of Bergius, is a branching tree, with long, taper, smooth, scrambling branches. *Leaves* ovate, acute, petiolate, veiny, smooth, a span long. *Hooks* none. *Panicles* small, axillary, three to five flowered, with short, round, rigid pedicels. *Flowers* very long, nodding, white, smelling like Jasmine. *Fruit* smooth, pear-shaped, the size of an ordinary apple or a Bonchretien pear; *seeds* about twenty, somewhat angular, about twelve lines long, imbedded in a pulp.—*L.*

History.—This is a tree indigenous to the Phillipine Islands, whose seeds are the St. Ignatius Bean of the shops. They are about the size of olives, rounded and convex on one side, and somewhat angular on the other, pale brownish externally, with a bluish-gray tint, greenish-brown internally. Their substance is hard, compact, and horn-like; they are inodorous and of an exceedingly bitter taste. Pelletier and Caventou on analysis, found them to contain the same constituent principles as the nux-vomica, but in different proportions. They contain about $\frac{12}{1000}$ of strychnia, and very little brucia. The strychnia may be obtained from them by rasping them, and completely removing the fatty matter with ether; then boil the rasped seeds deprived of fat, with alcohol, distill off the alcohol, and boil the residue with water and magnesia. Wash the precipitate, dry it, treat it then with anhydrous alcohol which dissolves the strychnia, which may be obtained pure by successive crystallizations. Nux-vomica yields about one-third less strychnia than St. Ignatius Bean, but on account of their scarcity they are seldom used either in medicine, or for the manufacture of strychnia. The St. Ignatius Bean yields its properties to water, but alcohol is its best solvent. Mr. Jas. M. Caldwell found the beans to contain strychnia, brucia, in combination with igasuric acid, a volatile principle (supposed to be an oil), a large amount of extractive and gummy matter, a small amount of resinous, coloring and fatty matter, a trace of bassorin, but no starch or albumen.—*Am. Jour. Pharm.*, *XXIX.*, 294.

Properties and Uses.—Very similar to those of nux-vomica seeds, but more energetic. Said to have been used in nervous debility, amenorrhea, chlorosis, epilepsy, worms, etc., with much benefit. T. C. Miller, M.D., uses it in chlorosis, as follows: Take of iodide of iron, extract of gentian, each one drachm; powdered savin leaves, and Ignatius Bean, each two scruples; mix, and divide into sixty pills. Two pills to be taken for a dose, and repeated three times a day, with frictions, to the spine and extremities, of tincture of camphor. It has been found so useful in nervous debility as to induce certain non-professional gentlemen to advertise and prescribe the following: Take of Alcoholic Extract of St. Ignatius Bean thirty grains, powdered gum Arabic ten grains; mix, and divide into forty pills, of which one is to be taken every night and morning. This might be useful in smaller doses, say, make the mass into eighty or one hundred pills, but as above it would prove dangerous with many persons. It appears to possess an influence over the nervous system of a tonic and stimulating character, not belonging to nux-vomica or strychnia. Dose of the powdered seed, one or two grains; of the alcoholic extract from one-eighth of a grain to one-quarter.

Off. Prep.—Extractum Ignatiæ Amaræ Alcoholicum; Tinctura Ignatiæ Amaræ.

ILEX OPACA.

American Holly.

Nat. Ord.—Aquifoliaceæ. *Sex. Syst.*—Tetrandria Tetragynia.

THE LEAVES.

Description.—This tree rises from twenty to forty feet in height, having *leaves* which are alternate, coriaceous, evergreen, smooth and shining, flat, oval, acute at the end, and the wavy margins armed with strong, scattered spiny teeth. The *flowers* are small, greenish-white, and are arranged in scattered clusters along the base of the young branches, and from the axils of the leaves. The *calyx* is persistent; *calyx-teeth* acute. The *corolla* is rotate, monopetalous, four-cleft; *stamens* erect, and alternate with the divisions. The *ovary* is globular, four-celled. *Stigmas* four, subsessile, obtuse. *Fruit* a red globular berry of four cells; *nutlets* four, striate. —*G.*—*W.*—*L.*

History.—The Holly is found growing throughout the United States from Maine to Louisiana, in moist woodlands, and flowering in June. It is quite common to the Atlantic States, especially New Jersey. The leaves are the medicinal parts; they have a bitter, somewhat harsh taste, but no odor, and yield their virtues to water or alcohol. They are said to contain *ilicin*, wax, gum, several salts, etc. *Ilicin* is the bitter principle upon which the febrifuge properties of the leaves depend; it may be obtained by diluting a strong alcoholic extract of the holly leaves with water, to which add sugar of lead, then sulphuric acid, and finally carbonate of lime. The ilicin being thus separated, dissolve it in alcohol; then evaporate to the consistence of honey.—*Rousseau.* Or to a decoction of the leaves, previously filtered, add animal charcoal, then boil for some time, and when the charcoal has all settled, wash it, add alcohol to it, filter, and evaporate to the consistence of molasses. The bitter liquid, thus obtained, yields a non-crystalline, gelatinous-looking substance, which is ilicin.—*Am. Jour. Pharm.*, *XXI.*, 89. It is soluble in alcohol, partially so in water, insoluble in ether, neutral, amorphous, and remaining unchanged when acted on by alkalies or acids. One ounce of it may be procured from a pound of the dried leaves.

The viscid substance of the inner bark furnishes the adhesive material known as *birdlime.* The berries are about as large as a whortleberry, of a red color, and an acrid, bitterish taste. Mr. D. Pancoast found in the *fruit* of Holly, tannic acid, pectin, albumen, an odorless, tasteless, and inert crystallizable principle, and another odorless, but intensely bitter principle, salts of potassa, lime, and magnesia, and protoxide of iron; in the *leaves* he found tannic acid, chlorophylle, a resinous extractive matter, and salts of potassa and lime.—*Am. Jour. Pharm.*, *XXVIII.*, 312.

Properties and Uses.—Holly leaves are tonic and febrifuge; said to be very efficacious in the treatment of intermittent fever, in doses of sixty grains of their powder administered an hour or two previous to the chill. The infusion has also proved beneficial in icterus, pleuritis, catarrh, variola, arthritis, etc. The berries are said to be emeto-cathartic, and cholagogue; from eight to fifteen of them will act as a hydragogue.

According to Dr. Rousseau, Ilicin acts decidedly upon the spleen and liver, as well as the pancreas, producing a sedative effect, and is a cheap substitute for quinia. Its dose is ten grains in pill form, gradually increasing it to thirty.

The European Holly, *Ilex Aquifolium*, together with several other species in this country, possesses similar properties. The *Ilex Vomitoria* or South Sea tea, an evergreen shrub growing in our Southern States, is the *Cassina* of the Indians. A liquid called *black drink* is prepared by boiling the toasted leaves in water; in the performance of their religious rites, and on great occasions when in council, the men only are permitted to drink this, for the purpose of cleansing their systems. The leaves have a rough, aromatic taste, no odor, and in large doses their decoction causes active emesis, catharsis, and diuresis; in small quantity it greatly increases the urinary discharge. A few leaves of this plant lessens the injurious influence of saline water, and is used for this purpose by persons along the sea shore in North Carolina. These plants are deserving a careful investigation.

IMPATIENS PALLIDA.

Jewelweed.

Nat. Ord.—Balsaminaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE HERB.

Description.—Impatiens Pallida, likewise known by the names of *Pale Touch-me-not*, *Balsam-weed*, etc., is an indigenous annual plant, having a smooth, succulent, tender, subpellucid, branching *stem*, with tumid joints, and growing from two to four feet in height. The *leaves* are oblong-ovate, coarsely and obtusely serrate, teeth mucronate, from two to five inches long, petiolate, and about two-thirds as wide. The *flowers* are large, pale-yellow, sparingly maculate, mostly in pairs; *peduncles* two to four flowered, elongated. *Sepals* apparently but four, the two upper united, the lowest gibbous, dilated-conical, broader than long, with a very short, recurved spur. *Petals* apparently two, unequal-sided and two-lobed, each consisting of a pair united. *Stamens* five, short; *anthers* opening on the inner face, connivent over the stigma. Ovary five-celled; *stigma* sessile. *Capsules* oblong-cylindric, an inch long, five-valved, bursting at the slightest touch when ripe and scattering the anatropous seeds.—*W.*—*G.*

IMPATIENS FULVA, or *Speckled Jewels*, is the most common variety; its *leaves* are rhombic-ovate, obtusish, coarsely and obtusely serrate, teeth mucronate. The *flowers* are smaller than in the previous one, deep orange, and maculate with many brown spots; *lower gibbous sepals* acutely conical, longer than broad, with an elongated, recurved spur.

IMPATIENS BALSAMINA, the *Garden Balsam* or *Ladies' Slippers*, is spontaneous about gardens; its *leaves* are lanceolate, serrate, upper ones alternate; *peduncles* clustered, one flowered; *spur* shorter than the flowers. The *flowers* are red, white, purple, pink, flesh-color, and scarlet; sometimes they are double. This is an exotic plant, a native of the East Indies, and cultivated as a beautiful garden annual. Its height is from one to five feet.—*W.*—*G.*

History.—These plants grow throughout the United States, in moist shady places, and along rills, in rich soil, flowering from July to September. The *I. Pallida* is most common northward and westward, and the *I. Fulva* southward. They all possess similar properties. The whole plants are used, and impart their virtues to water.

Properties and Uses.—They are aperient and diuretic; a decoction is recommended in jaundice, hepatitis and dropsy. The juice is said to remove warts, cure ringworms, salt-rheum, etc., and to cleanse foul ulcers; or it may be applied for these purposes in the form of a poultice boiled in milk. The recent plant boiled in lard, forms an excellent ointment for piles.

INULA HELENIUM.

Elecampane.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT.

Description.—Elecampane has a thick, tap-shaped, branching, aromatic and perennial *root*, with a thick, leafy, round, furrowed, solid *stem*, from four to six feet high, and branched and downy above. The *leaves* are large, ovate, serrated, veiny, smooth and of a dark-green color above, downy and hoary beneath with a fleshy midrib; the radical ones are petiolated, from one to three feet in length, by six or twelve inches wide; the cauline ones sessile, amplexicaul. The *flower-heads* are large, radiated, solitary at the downy summits of the branches, two inches broad, and of a bright-yellow color. The *involucre* is hemispherical; the *outer scales* are broad, recurved, leafy, finely downy on both sides, the *inner ones* linear. The *florets of the ray* are numerous, pistillate, long and narrow, in one row, and terminate in three unequal teeth; *disk-florets* numerous, perfect, tubular, five-toothed; *anthers* with two bristles at base. *Ovary* oblong. *Achenia* quadrangular, smooth; *pappus* simple, roughish. *Receptacle* reticulated, not quite smooth or naked.—*L.*—*W.*—*G.*—*T.*

History.—Elecampane is common to Europe, and cultivated in this country, growing in pastures, along roadsides, etc., flowering from July to September. The root, which is the part used, should be gathered in the second year of its development, and during the fall months. When recent it is quite thick, spindle-shaped, dividing, with many delicate fibers; its color is yellowish-gray externally, and dirty-white within. For medical use it is sliced lengthwise or transversely, has an agreeable aromatic smell, and a mucilaginous taste at first, succeeded by an aromatic bitterness, and then acrid and pungent.—*Ed.* Iodine colors the root brown; and the infusion is changed to a green color by the addition of sesquichloride of iron.—*P.* It yields its properties to water or alcohol, but more especially to the former. John found the root to contain a trace of volatile oil, Elecampane-camphor, wax, acrid soft resin, bitter extractive, gum, inulin, woody fiber, oxidized extractive with coagulated albumen, beside salts of lime, potassa and magnesia.—*P.*—*T.*

It yields its properties to alcohol or water, but more especially to the former. Analysis has found in it, a volatile oil, a peculiar camphor, wax, acrid resin, gum, bitter extractive, inulin, etc.

Inulin is a fine white starchy powder, tasteless and inodorous; its specific gravity is 1.356. Iodine gives it a yellow color, which distinguishes it from starch, and also renders it insoluble in water. It is soluble in boiling water, from which it is deposited as the solution cools. It is insoluble in cold alcohol. The dilute acids dissolve it, and transform it into sugar. It may be obtained by rasping the roots, boiling them in water, filtering the hot solution, and evaporating till a pellicle appears on the surface, when, on cooling, the Inulin is deposited, which being collected on a filter is washed and dried. Its constitution is identical with that of starch, its formula being $C_{12}H_{10}O_{10}$.—*T.* When pure, Inulin forms in gray, clear fragments, of a horny appearance; when strongly heated it is first converted into a kind of gum, becomes brown, then blackens, with the evolution of pungent vapors, and in the open air is entirely consumed. It may also be procured in abundance from dandelion roots, and those of the dahlia when dug up in the autumn.

In addition to this principle, Elecampane contains another, called *Helenin*, which forms in colorless prismatic crystals, which are heavier than water, slightly soluble in hot or cold water, very soluble in hot alcohol, but deposited as the liquor cools, very soluble in ether and oil of turpentine, and having the taste and odor of Elecampane. At 108° it melts into an oil; at a higher heat it sublimes without alteration. Nitric acid converts it into a resin.—*T.*

Helenin may be obtained by cutting the fresh root of Elecampane in slices, and exhausting with boiling alcohol of sp. gr. 0.833; the hot solution is to be filtered, and mixed with three or four times its bulk of cold water, when a slight turbidness results, and after standing twenty-four hours, long, dazzling white needles of pure Helenin will be found in the liquid, leaving very little in solution. The dried root gives a smaller quantity of this principle than the fresh.

Properties and Uses.—Elecampane is an aromatic stimulant and tonic, and is said to be expectorant, emmenagogue, diuretic and diaphoretic. It is much used in chronic pulmonary affections, weakness of the digestive organs, hepatic torpor, dyspepsia, and internally and externally in tetter, itch, and other cutaneous diseases. When added to the compound syrup of spikenard, it should be exhausted by boiling alcohol, and the tincture added to the syrup, instead of boiling it with the other articles, as is usually done. The alcoholic extract, combined with powdered extract of liquorice, benzoic acid, sanguinarina, and morphia, forms a lozenge or pill very valuable in chronic catarrhal, bronchial, and all pulmonary irritations; one drop of the oil of stillingia may be added to each lozenge, for bronchial and laryngeal affections. Dose of the powder, from one scruple to one drachm; of the infusion, from one to two fluidounces.

Off. Prep.—Decoctum Helenii; Extractum Helenii Hydro-alcoholicum; Syrupus Araliæ Compositus.

IODINIUM.

Iodine.

Iodine is contained in the largest quantity in the marine plants. The following is the percentage which several of these plants have yielded, when dried:

Zostera marina	0.0005	Fucus saccatus	0.124
Fucus vesiculosis	0.001	Fucus digitatus	0.135
Ulva lactuca	0.055	Fucus siliquosus	0.142
Ulva umbilicalis	0.059	Fucus saccharinus	0.230
Fucus filium	0.0894		

It has also been found in small quantity in Fucus nodosus, F. lorcus, F. cartilagineus, F. membranaceus, F. rubeus, and F. palmatus; in Sphærococcus helminthocorton and S. crispus; in Ulva linza, and U. pavonia; in Lichen confinis, Statice armeria, Grimmia maritima, Jungermania albitans, J. pinguis, Armeria maritima, Nasturtium officinale, Muscus corallinus, Asplenium trichomones, Aspidium capillus veneris, and in Confervæ and Oscillariæ, especially O. grateloupi. It has also been detected in sarsaparilla-root, in potassa, in the best of Waghäusel, in the turf of Hofwyl, and in the ash of several Ranunculaceæ, as R. flammula, and Ficaria ranunculoides. Sponge contains it, also the following marine animals: Spongia oculata, Gorgonia flabellum, Flustra foliacea, Asterias rubeus, Crognon vulgare, Ostrea edulis, Mytilus edulis, Pleuronectes flexuo, and varieties of Sertularia, Tubularia, Rhizostoma, Cyana, Doris, and Venus. Many varieties of Gadus contain it in their livers, and the liver of Raja clavata, and R. batis, are said to contain even more than the cod liver. Traces of iodine have been found in echini, the liquids of Julus fœtidissimus, crabs, starfish, salt herrings, etc.

Its presence in minerals and natural waters is frequent; it has been found combined with mercury and silver, in the cerussite of Catorce, Mexico; in very small quantity in Silesian zinc ore; in the salt of Hall, Tyrol; in native nitrate of soda; in Silesian coal; in the distillation products of coal; in the Jura limestones near Lyons and Montpelier; in clay, vegetable mold, sulphur, cinnabar, iron and manganese minerals, gypsum, white chalk, etc. It has likewise been detected in rain and fresh water, and in various mineral waters in different parts of the world, so that it is a more common substance than has been hitherto supposed.

Preparation.—Iodine is more commonly prepared from Kelp, the mother-water of which, after the carbonate of soda and chloride of potassium have been crystallized, contain it in larger quantity than any other substance. The kelp is lixiviated in water, the solution is concentrated by evaporation, and the various salts of soda and potassium are deposited, leaving a dense, dark-colored mother liquor, called iodine ley. Sulphuric acid is added to this to acidulate it, and which liberates carbonic acid sulphurous acid, and sulphureted hydrogen gases, while sulphur is deposited. As the sulphureted hydrogen escapes it is set fire to, in order to obviate its bad effects. The acidulated ley is now introduced into a leaden still, and heated to 140° F., when binoxide of manganese is added; a leaden head is then adapted, heat is applied, Iodine is evolved, and is collected into a series of glass receivers, on the inner surface of which it condenses. In this process, two equivalents of sulphuric acid react on one equivalent of binoxide of manganese, and on one equivalent of sodium; and yield one equivalent of Iodine, one of sulphate of soda, and one of the sulphate of the protoxide of manganese.—*P.*

Souberain states that a much larger quantity of Iodine may be obtained by the following process: Add sulphate of copper to the mother-water so long as a white precipitate of iodide of copper is thrown down. Then treat the supernatant liquid with more of the sulphate, together with iron-filings. The iron, taking the place of the copper in the solution, sets that metal free; and the metal, in the act of evolution, unites with what remains of the Iodine in the fluid, so that more iodide of copper is formed. When this iodide is mingled with oxide of manganese and sulphuric acid, a moderate heat decomposes it, and Iodine is sublimed.

History.—Iodine is a simple, non-metallic substance, exceedingly analogous to chlorine.—*Turner.* It was discovered in 1811 by M. Courtois, a saltpetre manufacturer at Paris; and in 1820, its medicinal virtues were first made known by Dr. Coindet, sen., of Geneva. It is prepared from the ashes of sea weeds, which ashes are of a dark color, and known by the name of *Kelp.*

Iodine is commonly sold in small scales, occasionally in solid masses; it has a grayish-black, or bluish-black color, a shining appearance, a peculiar and unpleasant odor, which irritates the nostrils, and an acrid taste. It is brittle and easily pulverized, fuses at 225° F., and is volatilized at 347°, though its vapor rises with that of boiling water. At common temperatures it slowly evaporates. Its specific gravity is 4.95. It stains the skin brownish-yellow, and if the contact be prolonged, will destroy the soft textures of the body. It is soluble in water containing syrup of orange; and six ounces of water, to which two grains of tannic acid are added, will dissolve ten grains of Iodine. Water dissolves only a 7,000th of its own weight of Iodine, and acquires a brownish-yellow color; in saline solutions it is much more soluble, and freely so in solutions of chloride of sodium, nitrate of ammonia, or iodide of potassium. It dissolves in twelve parts of rectified spirit at 60°, is very soluble in ether, or the volatile oils, but with some of them, especially those from coniferous vegetables, considerable heat is evolved, brisk effervescence ensues, and much of the iodine is discharged in vapor. It unites with oxygen or hydrogen to form acids; also with sulphur, phosphorus, carbon, chlorine, etc.; starch globules, if converted by boiling with water into soluble starch or amidin, form a blue precipitate with it, of such intensity that

Iodine may be detected in 450,000 parts of water. To effect this the Iodine must be free, which may be obtained by adding a little nitric acid to the suspected solutions, and the solutions must be cold. Iodine is easily mixed with fatty substances; it is apt to escape from the surface of ointments, unless united with iodide of potassium, which much impedes this result. The combination of Iodine with hydrogen forms a gaseous acid, called *Hydriodic Acid;* and that with oxygen forms three acids, the *Iodous*, *Iodic*, and *Hyperiodic Acids.* Starch is a delicate test to determine the presence of Iodine in urine, solutions, etc. Rabourdin names the following as a test: Dissolve iodide of potassium, half a grain, in distilled water fifty thousand grains. Of this solution take three hundred grains, and add to it nitric acid four drops, sulphuric acid thirty or forty drops. To the mixture thus prepared, add chloroform thirty grains, and agitate briskly; the Iodine present will impart a decided violet hue to the chloroform. Chloroform has also been employed by Rabourdin as a test for Iodine in cod-liver oil,—the distinctness of color occasioned depending upon the quantity of Iodine present,—thus, one hundred grains of the oil is mixed with a solution of ten grains of the purest caustic potassa in distilled water thirty grains; place the mixture in a small iron vessel, and, by heat, carefully reduce it to ashes. Lixiviate the ash with as little water as possible, filter, add nitric and sulphuric acids as in the preceding test, and add eight grains of chloroform. As the chloroform separates, it will be found of a violet hue, more or less decided, depending upon the quantity of Iodine contained in the oil. Dr. A. Overbeck gives the following very delicate test for Iodine: Some starch or sugar is poured into a test-tube with concentrated nitric acid, and heated over a spirit-lamp very gently until a violent evolution of gas ensues. The spirit-lamp is then removed, and the gas, which now evolves without a continuation of the application of heat, is conducted into the fluid to be tested, to which a solution of starch has been added. If the fluid contains only a millionth of iodide of potassium, a blue coloration directly results. By a further introduction of the gas, the iodide of starch precipitates out in flocks, and deposits itself, when at rest, as a compact, massy precipitate. In this way he found Iodine in many plants, particularly in the ashes of several ranunculuses. There are so many substances *incompatible* with Iodine, that its preparations are best given in simple water sweetened, and diluted to the patient's taste. Mr. D. S. Price has given a method by which Iodine may be detected, when combined as an iodide, even to the millionth part. The suspected liquid is mixed with starch, then acidulated with hydrochloric acid, and lastly, a solution of nitrate of potassa is added. As the Iodine is set free, a blue color is produced. When much Iodine is present, a dark blue color is produced immediately; when it amounts to only two or three millionths the color does not appear until after the lapse of some seconds. M. de Luca gives the following as a very sensitive test for ascertaining the presence of Iodine; introduce the suspected liquid into a tube closed at one end; add to it a few drops of sulphuret of carbon or chloroform, and then a very dilute aqueous solution of bromine. The bromine decomposes only the iodides; neither the chlorides nor bromides. By shaking the mixture the free Iodine is dissolved in the sulphuret of carbon or chloroform, to which it gives a more or less intense violet tint, or a rose color, when the quantity is very minute. An excess of bromine must be avoided, as it would interfere with the result.

"Various substances, such as coal, plumbago, binoxide of manganese, sand and charcoal, are said to have been employed for the purpose of *adulterating* Iodine; but in no samples of Iodine which I have examined, have I ever found any of these substances. Pure Iodine is completely soluble in alcohol, and evaporates when heated, without leaving any residuum. Any matter insoluble in alcohol, or not vaporizable by heat, is an adulteration."—*P.* The most frequent adulteration, however, is water, which may be known by the presence of visible moisture in the vial containing it, or by compressing the Iodine between folds of blotting paper. The Edinburgh College gives the following useful test for detecting impurities in Iodine: "Thirty-nine grains of the Iodine suspected, with nine grains of quicklime, and three ounces of water, when heated short of ebullition, slowly form a perfect solution, which is yellowish or brownish if the Iodine be pure, but colorless if there be above two per cent of water or other impurity."

Properties and Uses.—In large doses Iodine is an irritant and corrosive poison, stimulating the mucous membranes, liver, and absorbent glands, exciting the sexual organs, and producing debility of the digestive functions, muscular weakness, and emaciation. This influence upon the system, in which its poisonous effects are developed, is termed Iodism. Its symptoms are fever, violent vomiting and purging, great thirst, palpitation, extreme restlessness, rapid emaciation, acute, epigastric pain, cramps, small and frequent pulse, violent priapism, trembling, occasional syncope, etc. These symptoms vary in different persons, and have even terminated fatally. From four to six grains have produced these symptoms, hence it should never be administered in large doses, and when these effects appear, the medicine should at once be stopped.

In small or medicinal doses, it is a stimulant, tonic, alterative, diuretic, emmenagogue, and diaphoretic. It affects especially the absorbent and glandular systems, and its results vary according to the dose, combination, etc.; it has been detected in the urine soon after being swallowed, also in the saliva, perspiration, milk, and blood, and always in the form of hydriodic acid, or an iodide. It is supposed to undergo conversion in the stomach into hydriodic acid, and thus absorbed. Iodine and some of its preparations will occasionally produce salivation, soreness of the mouth, coryza, and often pustular eruptions. Under its influence, enlarged glands are brought to their normal size, and strumous ulcers gradually healed. Occasionally it has caused a rapid and permanent wasting away of the mammæ or testicles; and again, after a lapse of time, these organs have recovered their original development.

It is employed medicinally in various forms of disease, in some of which it produces astonishingly beneficial results. The diseases in which it appears to be more generally efficacious, are bronchocele, glandular obstructions, scrofula, syphilis, mercurio-syphilis, strumous ophthalmia, ozœna, ulcers of the integuments, enlargement of the external absorbent glands, chronic enlargement of the liver and spleen, mammæ, testes, and uterus, ovarian tumors, leucorrhea, amenorrhea, dysmenorrhea, caries, paralysis, chorea, rheumatism, and, in fact, all diseases of a hypertrophical, strumous, or cachectic character. In bronchocele it is most serviceable in the early congestive stage, or in the middle stage of gelatiniform effusion; in the indurated stage of the thyroid gland it is of little benefit. In this affection its use should be continued uninterruptedly for at least five weeks, and if no good effects appear, it may be laid aside. It should always be combined with some narcotic, to lessen or prevent its irritant results. The tincture diluted with three times its volume of water, has been recommended as an injection in hydrocele, after removal of the effused fluid, to stimulate the tunica vaginalis to adhesive inflammation. In erysipelatous inflammations it has been advised to paint the inflamed surface with a strong tincture; likewise in chilblains and cutaneous scrofula. Iodine is not a cumulative medicine, like lead, digitalis, etc., hence, whenever its effects approach iodism, a suspension of its use will gradually remove them; however, at the present time, these effects are not so often observed as among its early investigators. Yet, as some persons are very susceptible to its influence, the approach of iodism should be carefully watched, and its symptoms checked. In chronic diarrhea and dysentery, cholera-infantum, colliquative diarrhea of phthisis and scrofulous diseases, I have found the following a superior remedy. Take of iodine one and a half grains, sulphate of morphia one-eighth of a grain, geraniin twenty grains; triturate thoroughly together in a mortar, form into a pill mass with simple syrup, or extract of liquorice, and divide into ten pills; of these, one pill may be given every hour or two to an adult. In hepatic and splenitic affections, leptandrin may be substituted for the geraniin. In the Mexican diarrhea, I succeeded in curing every case in which the following preparation was employed: Take of iodine one and a half grains, tannic acid ten grains, distilled water five fluidrachms; mix together. For an adult, give one fluidrachm, every two hours, in syrup of ginger, or cinnamon-water; to be continued daily. Externally, iodine is used in the form of ointment for strumous ulcers, ophthalmia, and some cutaneous diseases. A *caustic iodine* is recommended as an application to stimulate or destroy soft and fungous granulations, and as a remedy for noli-me-tangere; it is made by adding an ounce each of iodine and iodide of potassium, to two ounces of distilled water. Iodine is contra-indicated in cerebral congestion and tendency to apoplexy, in menorrhagia, in disordered stomach or bowels, or wherever local diseases become attended with symptomatic fever, or with incidental febrile affections.

Iodine may be kept in a state of solution when added to mixtures in the form of tincture, by the addition of syrup of orange peel, or a few grains of tannic acid. When given internally to females it is apt to increase the quantity of the menstrual discharge and sometimes to multiply the periods of its appearance; if the symptoms are not very severe or alarming, but little interference will be required, as they will cease after a short time; where this is demanded, a cessation of the use of the remedy will most generally suffice. In the employment of iodine, if the urine is passed in quantity, and on examination is found to contain iodine, and the strength and appetite of the patient gradually return, it may be considered indicative of a beneficial therapeutical influence, and its use should be continued. Dose of iodine, in substance, half a grain, two or three times a day, in pill form; of the tincture, from five to fifteen drops, twice a day. The best forms for internal use are the compound tincture and compound solution. When given in powder, it should be united with opium, and formed into a pill with extract of liquorice. In poisoning by iodine, first evacuate the stomach, by giving an emetic in starch water, and afterward administer freely starch water, or flour, or arrow-root in water.

A preparation called *Iodoform*, or *Teriodide of Formyle*, is represented by M. Righini as possessing remarkable antiseptic and antispasmodic properties. He states that the inhalation of its ethereal solution is of great service in retarding the progress of phthisis. Iodoform is a yellow crystalline substance, insoluble in water, soluble in ether or alcohol, and having an odor like that of saffron. It is formed by heating an alcoholic solution of iodide of potassium to 104° F., then adding and stirring in successive quantities of chlorinated lime, until the dark-red color of the liquid is removed. On standing crystals of iodoform and iodate of lime are precipitated. Dissolve these in boiling alcohol of ninety per cent., the iodoform only is dissolved, and is deposited in crystals as the solution cools; its formula is $C_2\ HI_3$.

Another preparation, the *Iodide of Ethyle*, Ae I, is made by cautiously adding phosphorus to a mixture of alcohol and Iodine, and then distilling at a gentle heat; the product is received into water, and then agitated with more water, from which the heavy oily ether separates on standing. This is redistilled with oxide of lead and chloride of calcium until the product is free from phosphorus and water. Iodide of ethyle is a powerful anæsthetic when inhaled, but it must be entirely free from phosphorus. It is a most valuable remedial agent, patients being able to bear a much larger quantity of iodine in this form than they possibly could bear in any other manner. It has been used internally with success in scrofulous diseases, by inhalation in diseases of the lungs and heart, and as a local application to painful and irritable ulcers, and scrofulous ulcers.—(See *Hydriodic Ether.*)

An adhesive Iodine paint is used at the Moorfield's Ophthalmic hospital, as an application to chronic inflammations of the eyelids; the mastic prevents the paint from spreading on the more delicate structures in the neighborhood; take of alcohol two fluidrachms, spirit of nitric ether four fluidrachms, mastic half a drachm, Iodine to saturation; mix. According to Mr. R. H. Brett *iodic acid* added to the vegetable alkaloids, with a few drops of water, gives rise to a series of distinct explosions, accompanied by an evolution of gas, and may be used to determine whether an unknown body is an alkaloid; it appears to have the same action with their salts.

Off. Prep.—Emplastrum Belladonnæ Compositum; Ferri Iodidum; Liquor Ferri Iodidi; Liquor Iodini Compositus; Potassii Iodidum; Tinctura Iodini; Tinctura Iodini Composita; Unguentum Iodidi Compositum.

IPOMÆA JALAPA.

Jalap.

Nat. Ord.—Convolvulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—Jalap has a fleshy, tuberous pyriform root, with numerous roundish tubercles. The *stems* are several, smooth, brownish, very slightly rough, with a tendency to twist, and twining about surrounding bodies. The *leaves* are long petioled, the first hastate, the succeeding ones cordate, acuminate, mucronate, smooth, deeply incised at base, conspicuously veined beneath. The *peduncles* are axillary, two-flowered, rarely three, twisted, as long as the petioles. The *calyx* has no bracts, and is composed of five smooth, obtuse, mucronate sepals. The *corolla* is funnel-shaped, purple, with a long, somewhat clavate tube, and an undulated limb, with five plaits. *Stamens* five; *filaments* smooth, unequal, longer than the corolla tube; *anthers* white, oblong-linear, projecting. *Ovary* slender, two-celled; *stigma* simple, capitate, deeply furrowed. *Capsule* two-celled; *cells* two-seeded; *seeds* unknown.—*L.*—*N.*

History.—It is only within a few years that any certainty has existed in relation to the plant from which the Jalap root was obtained. It was first spoken of in 1609, as *Bryonia Mechoacana Nigricans*, then it was regarded by Ray as *Convolvulus Americanus jalapium dictus*, after which Tournefort, being deceived by persons who asserted that they had seen the plant growing, referred it to a species of *Mirabilis.* Balfour placed it as the *Exogonium Purga*, and Linnæus named it *Convolvulus Jalapa*, and thus much difference of opinion existed, until in 1827, when Dr. J. R. Coxe of Philadelphia succeeded in obtaining perfect flowers from roots of the true plant furnished to him from their native soils, and thus first made its true character known to the scientific world. The name of *Ipomœa Purga* was bestowed upon the plant by Wenderoth, and Hayne, but as the authorities of this country have, undoubtedly, the first claim, it may be viewed as fixed that *I. Jalapa*, the name originally given to it by Nuttall, is the officinal plant.

The Jalap plant is found at an elevation of nearly six thousand feet above the level of the sea, growing in Mexico, near Chicanquiaco and Xalapa, from which last named place it is generally exported, and from which it has also obtained its name. It is generally imported in bags containing one or two hundred pounds. The root is the officinal part, and is gathered at all seasons, but principally in March and April, when the young shoots are appearing. The plant might be cultivated in the southern parts of the United States.

When fresh, the root is black externally, white and milky within, and varies in size according to its age, from that of a walnut to that of a moderate-sized turnip. It is dried in net bags over the fire, sometimes entire, and sometimes in sections. It is imported in irregularly round or pear-shaped masses, seldom as large as the fist, and is either entire, or sliced into longitudinal or transverse pieces. It is ponderous, hard, dark-brown externally, rough and wrinkled, internally grayish-brown and formed of irregular concentric layers presenting brilliant lines and points, of a faint, disagreeable odor, increased by rubbing or powdering it, and of a nauseous and sweetish taste, succeeded by some acridity. It is often preyed upon by insects, which, however, leave its active part untouched, rendering it consequently more energetic; Jalap thus preyed upon is used for procuring the resin, but should not be given internally, except in much smaller doses than for the ordinary root. Jalap is rather difficult to pulverize, but if triturated with cream of tartar, sugar of milk, or other hard salt, the process of pulverization is facilitated, and the powder rendered much finer. When in powder, the color is a pale grayish-brown, and when in contact with the mucous membrane of the air-tubes causes coughing, and sternutation, with an increased discharge of saliva. Its solvents are water, alcohol, or spirits. Water takes up but a small portion of its cathartic principle, but considerable of an amylaceous and mucilaginous extractive matter. Alcohol dissolves its resin; on which its cathartic virtues depend. Proof-spirits or diluted alcohol completely extract its active properties. Analysis of the commercial Jalap has detected in it, resin soluble in alcohol, a soft resin soluble in ether, also, colored gummy extract, starch. Geiber found Jalap to contain hard resin 7.8, soft resin 3.2, acrid extractive 17.9, gummy extractive 14.4, coloring matter 8.2, liquid sugar 1.9, gum with salts 15.6, bassorin 3.2, vegetable albumen 3.9, starch 6.0, lignin 8.2, malic acid and malates of potassa and lime 2.4, chlorides of calcium and potassium 1.4, phosphates of magnesia and lime 1.7, carbonate of lime 3.0. Guibourt found in it resin 17.65, liquid sugar by alcohol 19.00, brown saccharine extract 9.05, gum 10.12, starch 18.78, woody fiber 21.60. Jalap root is seldom adulterated; the best quality may be known by being compact, ponderous, dry, dark, with many shining lines and points; if light, whitish internally, spongy, friable, and of a dull fracture, it should be rejected. Several adulterations are spoken of by authors, but they can usually be detected without difficulty. The resin is more liable to be adulterated with guaiacum, resin and colophony, and which may be detected by sulphuric ether, which does not dissolve pure Jalap resin.

Properties and Uses.—Jalap is an irritant and cathartic, operating energetically, occasioning profuse liquid stools with griping, and sometimes sickness at stomach, or even vomiting. Large doses produce violent hypercatharsis, sometimes terminating fatally. When applied to a wound it is said to induce purgation. Notwithstanding its activity, it is a safe and convenient purgative, much in use among the profession, and is useful in all cases where it is desirable to produce an energetic influence on the bowels, or to obtain large evacuations. In intestinal inflammations it should not be used. United with the bitartrate of potassa, its hydragogue properties are much increased, and thus proves beneficial in dropsies, as well as in some forms of scrofula. It is stated that the aqueous extract of Jalap, the root having been previously exhausted of its resin by alcohol, will exert no cathartic influence, but will operate as a powerful diuretic. Three grains of Jalap taken an hour before each meal, act as a slight nauseant, destroying a desire for food among persons who are apt to eat too freely. If Jalap is digested in ether, its nauseous taste and smell will be wholly removed, without lessening its cathartic power. A biscuit is sometimes made for those to whom it is extremely nauseous and disagreeable; five drachms of Jalap, thirty of sugar, and four ounces of flour, are made into fifteen biscuits after the usual mode; one biscuit is a dose. The tendency of Jalap to gripe and nauseate, may be obviated by adding to the dose a grain or two of camphor, or three grains of cloves. The dose of powdered Jalap is from ten to thirty grains (the aqueous extract ought not to be used, except as a diuretic); of the tincture, from one to four fluidrachms; the resin, or alcoholic extract is given in from two to eight grain doses, being usually rubbed up with sugar, or in emulsion, for the purpose of lessening its disposition to produce painful irritation of the intestinal mucous membrane. As a hydragogue, two drachms of the bitartrate of potassa are added to ten or thirty grains of pulverized Jalap. The Jalap resin insoluble in ether is stated by W. Mayer to be tasteless, odorless, colorless, softening at 266°, and melting at 302° F. He calls it rhodeoretine, $C_{72} H_{60} O_{37}$, which is converted into rhodeoretine acid, $C_{72} H_{64} O_{40}$, by the action of bases. It purges violently in three or four grain doses, and appears to be the active principle of Jalap.

Off. Prep.—Confectio Sennæ Composita; Extractum sive Resina Jalapæ; Pulvis Jalapæ Compositus; Tinctura Jalapæ Composita.

IRIS VERSICOLOR.

Blue Flag.

Nat. Ord.—Iridaceæ. *Sex. Syst.*—Triandria Monogynia.

THE RHIZOMA.

Description.—Iris Versicolor is an indigenous plant, with a fleshy, horizontal, fibrous root or rhizoma. The *stem* is two or three feet in height, terete, flexuous, round on one side, acute on the other, and frequently branched. The *leaves* are about a foot long, half an inch to an inch wide, ensiform, striated, erect, and sheathing at base. *Bracts* scarious. The *flowers* are from two to six in number, generally blue or purple, *ovary* obtusely three-cornered. *Peduncles* are of different lengths, and flattened on the inside. *Sepals* spathulate, beardless, the border purple, and the claw variegated with green, yellow, and white, and veined with purple. *Petals* erect, varying in shape from spathulate to lanceolate, usually paler than the outer, entire or emarginate. *Stigmas* three, petaloid, purple or violet, bifid, crenate, and more or less reflexed at the point. *Stamens* three, concealed under the stigmas, with oblong-linear anthers. *Capsule* three-celled, three-valved, and when ripe oblong, turgid, three-sided, with roundish angles. *Seeds* numerous, flat.—*L.*—*B.*—*W.*

History.—Blue Flag is common throughout the United States, growing in moist places, and presenting blue or purple flowers from May to July. The root is the officinal part; in appearance it very much resembles that of the *Acorus Calamus;* it has a peculiar odor, augmented by rubbing or pulverizing, and a disagreeable taste with considerable acridity. Its active properties are taken up by boiling water in infusion, and by alcohol or ether; and its acridity, as well as its medicinal virtues, are diminished by age. The fresh root sliced transversely, dried in an atmosphere not exceeding 103° F., pulverized, and then placed in darkened and well closed vessels to protect it from the action of light and air, will have its medicinal virtues preserved for a great length of time. It contains mucilage, oil, and resin, from the former of which it derives diuretic properties, by decoction. The *resin* is of a light brown color, of a faint odor, and of a taste resembling that of the root; when perfectly freed from oil it is whitish yellow. Its therapeutical influences are not positively known. The *oil* possesses in a high degree the taste and smell of the root, and is the principle to which it owes its medicinal activity. The *oleo-resin* is obtained for medical purposes, under the name of Iridin.

Properties and Uses.—This is one among our most valuable medicinal plants, and is capable of fulfilling quite a number of indications. The powdered root of Blue Flag is cathartic, alterative, sialagogue, vermifuge, and diuretic. In dropsy, it may be used alone in doses of ten grains of the powdered root every two hours, as a hydragogue, or it may be combined with corn snakeroot, *Eryngium Yuccefolium.* In anasarca and hydrothorax, the saturated tincture of the root, taken in teaspoonful doses, every two or three hours, until its hydragogue influence is obtained, will be found serviceable; in some instances it may be combined with an equal quantity of the saturated tincture of *Euphorbia Ipecacuanha*. In scrofula, and syphilis, whether primary or secondary, its acts as a powerful and efficacious agent, and may be used alone, or combined with mandrake, poke, black-cohosh, and other alteratives. In chronic hepatic, renal, and splenitic affections, five or ten grains of the powdered root, will be found very valuable. Equal parts of Blue Flag root, mandrake root, and prickly-ash bark, combined, and given in doses of ten grains every two or three hours, to fall short of catharsis, will act as a powerful alterative, frequently causing a copious salivation without injury to the teeth or gums. In chronic rheumatism, mercurio-syphilis, dyspepsia, tapeworm, gonorrhea, leucorrhea, dysmenorrhea, and constipation, it has been used with positive advantage, either alone, or in combination with other agents. A writer says, " The root of the Blue Flag extends its influence through every part of the system in small doses and repeated at short intervals; it seems to act more particularly on the glandular system, exciting them to a discharge of their respective offices; in large doses it evacuates and exhausts the system, acting on the liver, and the alimentary canal throughout."

In general practice salivation is not, as a common rule, desired for the cure of disease, yet we have many articles which produce it, and often without the practitioner's being aware of the fact, and hence, when it does occur, the cry is at once raised that mercury is used. Salivation caused by vegetable agents may be known from that by mercury, by the absence of mercurial fetor, and no sponginess of the gums or loosening of the teeth. The dose of pulverized Blue Flag is from five to twenty grains; of the saturated tincture from ten to sixty drops. In some persons, and when exhibited in large doses, it is apt to occasion much distressing nausea, with considerable prostration, these effects may be obviated or mitigated, by combining it with a few grains of capsicum or ginger, a rain of camphor, or four or five grains of caulophyllin.

There are several species of Iris, as *I. Virginica*, *I. Lacustris*, etc., which probably possess similar properties, and which are often collected and mixed with the officinal article. The *Iris Florentina*, or Florentine Orris, is said to be emetic, cathartic, and diuretic, but is seldom employed, except in the composition of tooth-powders, and to conceal an offensive breath.

Off. Prep.—Extractum Iridis Hydro-alcoholicum; Extractum Iridis Fluidum; Tinctura Iridis; Syrupus Styllingiæ Compositus.

IRIDIN.

Iridin.

THE OLEO-RESINOUS PRINCIPLE OF IRIS VERSICOLOR.

Preparation.—This is prepared in the same manner as xanthoxylin, but being an oleo-resin can not be reduced to powder. I had the pleasure of calling the attention of the profession to this article in 1844, about the same time I introduced the podophyllin (to remarks on which I refer the reader), and again in 1846. I have used it extensively and find it to be an invaluable medicine. It is now prepared by W. S. Merrell and Dr. F. D. Hill, of Cincinnati, for the use of practitioners generally. It is soluble in alcohol, but insoluble in water.

Properties and Uses.—This is cathartic, alterative, sialagogue, diuretic and anthelmintic. I have used it more or less extensively for several years in combination with the resin of podophyllum, and in the form of pill, for dropsy, primary and secondary syphilis, chronic visceral affections, rheumatism, gonorrhea, and many female affections. It is not as nauseating, when given alone, as podophyllin, and requires rather larger doses. One grain triturated with ten grains of sugar, may be given in three-grain doses, every hour or two, until a cathartic effect is produced. I have long used the following as a sialagogue in those cases of glandular diseases which seemed to resist the action of other means, viz.: equal parts of Iridin, Podophyllin, and Xanthoxylin, given in grain doses every hour or two until ptyalism was produced. By trituration with sugar or lactin, this combination becomes more active. Iridin is not as prompt in its effects as podophyllin, although it may be substituted for this in all instances; and its alterative influence, though slowly developed and without any immediate appreciable effect, is yet positive and certain. For the last six years I have used it in preference to the podophyllin, in uterine diseases, conjoined with cimicifugin. The usual dose of Iridin is from one-half of a grain to five grains. Physicians will occasionally meet with patients upon whom podophyllin, even in small doses, exerts a powerful and long continued influence, sometimes not readily obviated; in such cases, Iridin seems to me to be more especially indicated. The addition of capsicum or caulophyllin to Iridin, mitigates any harshness of action which it may produce. A combination of Iridin, podophyllin and xanthoxylin, or corydallia is a most powerful and certain remedy for syphilis, either primary or secondary, and will be found very useful in scrofula. Iridin three grains, leptandrin six grains, and bitartrate potassa twenty grains, made into one powder, forms a hydragogue cathartic of much value in some forms of dropsy. Iridin may be used in all cases where the root of the iris is indicated.

JANIPHA MANIHOT.

Tapioca.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE FECULA OF THE ROOT.

Description.—This plant is a native of Brazil, and is cultivated in various parts of South America. It has a large, fleshy, oblong, tuberous *root*, often weighing thirty pounds, and full of a wheyish, venomous juice. The *stems* are white, crooked, brittle, jointed, pithy, usually six or seven feet high, and having a smooth, white bark; the *branches* are crooked, and have, on every side, near their tops, *leaves* which are irregularly placed on long, terete petioles, broadly cordate in their outline, and divided nearly to their base into five spreading, lanceolate, entire lobes, attenuated at both extremities, dark-green above, pale glaucous beneath; the midrib strong, prominent, and yellowish-red below with several oblique veins, connected by lesser transverse ones, branching from it. *Stipules* small, lanceolate, acuminate, caducous. The *flowers* are in axillary and terminal racemes. *Pedicels* with small, subulate bracts at their base. *Male flowers* smaller than the female. *Calyx* campanulate, divided into five spreading segments, purplish externally, fulvous-brown within. *Disk* orange-colored, fleshy, annular, ten-rayed; *stamens* ten, alternating with the lobe of the disk. *Filaments* shorter than the calyx, white, filiform, free. *Anthers* yellow, linear-oblong. *Female flower* of the same color as the male, deeply five-parted, the segments lanceolate-ovate, spreading. *Disk* an annular, orange-colored ring, in which the purple ovate, furrowed ovary is imbedded; *style* short. *Stigmas* three, reflexed, furrowed and plaited, white. *Capsule* ovate, three-cornered, tricoccous; *seeds* elliptical, black, shining with a thick, fleshy funiculus.—*L.*—*Wi.*

History.—This plant, formerly designated by botanists as the *Jatropha Manihot*, until its removal by Kunth, furnishes a large amount of food to the inhabitants of Southern America, under the name of Mandioca, Tapioca, or Cassava Starch. According to Pohl, there are two distinct species of the plant, though other botanists consider them to be mere varieties. The root of one is fusiform, brown externally, not exceeding six ounces in weight, with a sweet, amylaceous taste, and may be eaten with impunity; it is termed Sweet Cassava. The root of the other and more common variety is much larger, knotty, black externally, and contains a bitter and poisonous milky juice; this is called Bitter Cassava, which, according to Henry and Boutron-Chalard, contains free hydrocyanic acid, starch, an organic salt of magnesia, saccharine matter, a bitter principle, a crystallizable fatty matter, vegetable osmazome, phosphate of lime, and lignin. Each of these plants furnishes a considerable quantity of starch. Tapioca is prepared from the Bitter Cassava. The large, fleshy and tuberous root is reduced to a pulp, this is washed with cold water in funnel-shaped mat-filters, the starch is allowed to subside in the milky fluid which passes through, and is then elutriated in the usual manner, and finally converted into the granular form by drying it on hot plates. Should any of the volatile poisonous principle remain in the meal previous to drying it, the heat employed for this purpose entirely removes it. Tapioca is a very pure starch, in the form of irregular warty grains, seldom larger than a pea, white, tasteless and inodorous. Boiling water dissolves it almost entirely, or, if in small proportion to the Tapioca, it forms with it a translucent, tasteless jelly, and firmer than is made with most varieties of starch. Cold water partially dissolves it, forming a liquid which yields a blue precipitate with iodine. Under the microscope it is found to consist of aggregated starch-globules, about the two-thousandth of an inch in diameter, partly broken, partly entire, the broken ones only being soluble in cold water, more uniform than the granules of most other varieties of fecula, with a distinct hilum, which is surrounded by rings, and bursts in a stellate manner. The rupture observed in some of the granules is owing to the heat employed in drying.—*C.*—*P.*

Properties and Uses.—Nutritive and demulcent. Used as a light and agreeable nourishment for the sick. It makes an excellent nourishment for infants about the time of weaning, and is less apt to turn sour upon their stomach than any other kind of farinaceous food. For the sick and convalescent, its flavor may be improved by raisins, sugar, prunes, lemon-juice, wine, spices, etc., as may be required.

JEFFERSONIA DIPHYLLA.

Twinleaf.

Nat. Ord.—Berberidaceæ. *Sex. Syst.*—Octandria Monogynia.

THE ROOT.

Description.—This is an indigenous, perennial plant, sometimes known as *Ground-squirrel Pea* and *Rheumatism-root.* The *rhizoma* is horizontal, with matted fibrous radicles; the *scape* or *stem* is simple, naked, one-flowered, and from eight to fourteen inches in height. The *leaves* are in pairs, binate, placed base to base, oval, broader than long, ending in an obtuse point, smooth, glaucous beneath, and on petioles as long as the scape, which arise from the rhizoma. The *flowers* are large, regular, white. The *calyx* consists of four colored, deciduous sepals. The *corolla* has eight flat, oblong, spreading, incurved petals. The *stamens* are eight, with oblong-linear anthers, on slender filaments. *Ovary* ovoid, soon gibbous, pointed; stigma two-lobed. The *capsule* is obovate, or somewhat pear-shaped, stipitate, one-celled, opening half-way round horizontally, making a persistent lid. *Seeds* many on the lateral placenta, with a fleshy lacerrate aril on one side, oblong.—*W.*—*G.*

History.—This plant is found from New York to Maryland and Virginia, and in many parts of the Western States, growing in limestone soil, in woods, and near streams and rivers, flowering in April and May. The root, which is the part used, is a thick, knotty rhizoma, from which long fibrous roots proceed, and is of a brownish-yellow color. The epidermis is somewhat corrugated, and in some specimens transversely cracked. The bark is resinous, and contains the active principle of the root. The central portion is ligneous, of a light straw color, and is easily separated by bruising the root. The root has an odor similar to that of *Podophyllum*, and a bitter, mucilaginous taste at first, followed by a pungent, nauseous, and acrid taste. Water or alcohol extracts its virtues. An analysis by Prof. E. S. Wayne, of Cincinnati, Ohio, showed this plant to contain tannic acid, gum, starch, pectin, fatty resin, a saccharine and slightly bitter substance, a bitter matter, an acrid and nauseous matter somewhat similar to polygalic acid, which occasioned vomiting with persistent nausea, carbonate, and sulphate of potassa, lime, iron, magnesia, silica, etc.—(*See Am. Jour. Pharm., vol. XXVII., p.* 1.)

Properties and Uses.—Diuretic, alterative, antispasmodic, and a stimulating diaphoretic. Successfully used in chronic rheumatism, secondary or mercurio-syphilis, syphilitic pains, dropsy, in many nervous affections, spasms, cramps, nervous excitability, and even during pregnancy. In syphilitic diseases it is combined with *corydallis*. As a gargle it has been beneficial in diseases of the throat, ulcers about the fauces, scarlatina, ophthalmia, and indolent ulcers. It is administered in decoction and saturated tincture. Dose of the decoction, from two to four fluidounces, three times a day; of the tincture, from one to three fluidrachms, three times a day. Some practitioners use this plant as a substitute for senega, as an expectorant and emetic.

Off. Prep.—Decoctum Jeffersoniæ.

JUGLANS CINEREA.

Butternut.

Nat. Ord.—Juglandaceæ. *Sex. Syst.*—Monœcia Polyandria.

THE INNER BARK OF THE ROOT AND LEAVES.

Description.—This tree, also known as *White Walnut*, *Oil Nut*, etc., is indigenous, and grows to a height of from thirty to fifty feet, with a trunk about four feet in diameter at some four or six feet from the ground, and which, at eight or ten feet from its base, divides into numerous, nearly horizontal, wide-spreading *branches*, covered with a smooth, gray bark, and forming a large tufted head, giving to the tree a peculiar appearance. The *leaves* are alternate, from twelve to twenty inches long, and consist of seven or eight pairs of *leaflets*, which are two or three inches in length, oblong-lanceolate, rounded at the base, acuminate, finely serrate and downy, the petioles and branchlets downy with clammy hairs. The male and female *flowers* are distinct upon the same tree. The former are in large aments, four or five inches long, hanging from the sides of the last year's shoots, near their extremities. The scales which compose them are oblong and deeply-cleft on each side into about three teeth or segments. The *anthers* are about eight or ten in number, oblong and nearly sessile. The fertile flowers grow in a short spike at the end of the new shoot; they are sessile, and universally pubescent and viscid; when fully grown, they seem to consist of a large oblong *ovary*, and a forked, feathery *style*. The top of the ovary, however, presents an obscurely four-toothed *calyx*. Within this is a *corolla* of four narrow lanceolate petals growing to the sides of the style; the style divides into two large, diverging, feathery, rose-colored *stigmas*, nearly as long as the ovary. The *fruit* is sometimes single, suspended by a thin pliable peduncle; sometimes several are together on the sides and extremity of the same peduncle, of a green color, brown when ripe, oblong-oval, obtusely-pointed, hairy, and extremely viscid. The *nut* or *nucleus* is of a dark color, hard, oblong, pointed, carinated on both sides, its whole surface roughened by deep indentures and sharp prominences. The *kernel* is oily, pleasant-flavored, and edible.—*L.*—*W.*—*B.*

JUGLANS NIGRA, or *Black Walnut*, grows from sixty to ninety feet high, with a diameter of from three to six feet, with a brown bark. The *leaflets* are numerous, seven to ten or eleven pairs, ovate-lanceolate, serrate, subcordate at base, taper-pointed at the apex, smooth above, the lower surface and the petioles minutely downy. The *fruit* is globose, with scabrous punctures, the *nut* corrugated, and its kernel sweet, more pleasant-tasted and less oily than the butternut, but greatly inferior to the European walnut, *Juglans Regia.*—*G.*—*W.*

History.—These trees are common to North America. The *J. Cinerea* is found throughout the New England, Middle, and Western States, and Canada, growing in rich woods, on elevated river banks, and on cold, uneven rocky soils, flowering in April and May, and maturing its fruit during the middle of autumn. A saccharine juice, which furnishes a good sugar, is had by tapping the trees early in the spring. Butternut wood is light, of a reddish hue, not apt to become worm-eaten, and is frequently used in panneling and ornamental work. The fruit collected sometime previous to its ripening is used by many persons in the form of pickles; the bark and shells of the nuts furnish a dye of a chocolate color, for woollen goods, but as a dye the bark of the black walnut is preferable. In the recent state, Butternut bark is acrid, and rubbed upon the surface of the body, occasions a redness, and sometimes blisters. The officinal parts are the leaves and the inner bark of the root, the latter of which is best when gathered from April to July. Its original whiteness soon begins to change upon exposure to the air from a yellow to a dark-brown color. Its odor is faint, its taste amarous, with some acrimony, and its fracture fibrous. Water at 212° F. takes up all its active properties. Mr. S. Wetherell found the bark to contain resin, fixed oil, saccharine matter, lime, potassa, a peculiar principle, and tannic acid.—*P.*

The *J. Nigra* is rarely found in the Northern States, but is more common to the Middle and Western. It flowers and ripens its fruit at the same time with the Butternut. The duramen of its wood is compact and heavy, of a deep violet-color, surrounded with a white alburnum. It is extensively used in building, and for cabinet-work.—*G.*—*W.*

Properties and Uses.—Butternut is a gentle and agreeable cathartic, causing no griping, nor subsequent weakness of the intestines. It resembles rhubarb in its effects, but without inducing constipation after its action. It is very valuable in cases of habitual constipation, colo-rectitis, and several other intestinal diseases. It is generally used in the form of an extract, in doses of from ten to thirty grains. A strong decoction of it is much employed in some sections of the country, as a domestic remedy in intermittent and remittent fevers, as well as in other diseases attended with congestion of the abdominal viscera; it is also reputed efficacious in murrain of cattle, and yellow-water in horses. The juice of the rind of the Black Walnut (*Juglans Nigra*) is said to cure herpes, eczema, porrigo, etc., and a decoction has been used to remove worms. The bark is very astringent and acrimonious, and is more commonly employed in dyeing. The European Walnut (*Juglans Regia*) has recently been found by Prof. Negrier, of Angers, to be very efficacious in scrofula. To children laboring under this disease he administered a strong infusion of the leaves in teacupful doses, or, the aqueous extract in doses of six grains, or a proportionate dose of a syrup prepared with eight grains of the extract to ten drachms of syrup, repeating the dose from two to five times a day. All the ulcers and sore eyes were washed with a strong decoction of the leaves, and the ulcers covered with linen compresses steeped in this decoction, or poultices made with flour and the decoction. No injury followed its long-continued administration. The above American species would probably answer as good a purpose. *Juglandin* is the name of an agent prepared from the J. Cinerea, by Mr. W. S. Merrell. It is of a jet-black color, brittle like starch, with the peculiar odor of the bark, and a bitter, somewhat pungent and aromatic taste, with a stimulant effect on the fauces. It is insoluble in water, but becomes soluble on the addition of ammonia or liquor potassa; and the addition of acids to the solution precipitates the juglandin. Sulphate of iron added to water containing juglandin, darkens it. It is nearly soluble in alcohol, more so on the addition of ammonia; partially soluble in ether. Muriatic acid turns a thin layer of it green; sulphuric acid, reddish-black; and with nitric acid it effervesces, and becomes yellowish-red. So far as employed, this article has answered an admirable purpose as a laxative and cathartic, in doses of from one to five grains; and will, probably, prove an invaluable agent. It is prepared by adding a saturated tincture of the bark of Butternut to twice its volume of water, and distilling off the alcohol; the juglandin is precipitated in the water, from which it must be removed and dried; acts best combined with Castile-soap.

Off. Prep.—Extractum Juglandis.

JUNIPERUS COMMUNIS.

Juniper.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Diœcia Monadelphia.

THE FRUIT OR BERRIES.

Description.—This is a small evergreen shrub, never attaining the height of a tree, with many very close branches, the extremities of which are smooth and angular. The *leaves* are attached to the stem or branches in threes, in a verticillate manner, linear-acerose, sharply mucronate, entire, shining-green on their lower surface, channeled and glaucous along the center of their upper surface; they are always resupinate, and turn their upper surface toward the ground. The *flowers* are diœcious, the males in small axillary aments, with roundish, acute, stipitate scales, inclosing several anthers. Female flowers are on a separate shrub, having a small, three-parted involucre growing to the scales, which are three in number. The *fruit* is fleshy, roundish-oblong, berried, of a dark-purplish color, formed of the confluent succulent scales, marked with three prominences or vesicles at top, ripening the second year from the flower, and containing three bony, angular seeds.—*L.*

History.—Juniper is common to Europe and this country, growing in dry woods and hills, and flowering in May. The fruit or berries are the officinal parts; those which are imported from the southern parts of Europe are the best. The American berries possess less virtue, and are seldom employed. Juniper berries are about the size of currants, of a purplish-black color, shrunken, marked at the top with a tri-radiate groove, and at the base with the bracteal scales; they contain three seeds. Their odor is peculiar, terebinthine, and aromatic, and their taste terebinthine and sweetish, succeeded by some bitterness; these qualities are due to an essential oil, which may be obtained by distillation with water. They yield their properties to hot water, or alcohol. Trommsdorf found them to contain volatile oil, wax, resin, saccharine matter, acetate and malate of lime, gum, lignin, water, and several salts.—*P.*

Properties and Uses—Both the berries and oil are stimulating, carminative, and diuretic. The oil is said to act like copaiba in arresting mucous discharges, especially from the urethra. It is contained in the spirituous liquor called Hollands, one of its best forms as a diuretic. Five minims of the oil, with one fluidrachm of nitrous ether, given three times a day in any common vehicle, produces diuresis in dropsy when other means fail. The berries are employed principally as an adjunct to other diuretics; and have been found efficacious in gonorrhea, gleet, leucorrhea, cystirrhea, affections of the skin, scorbutic diseases, etc. Dose of the berries, from one to two drachms; of the oil, from four to twenty minims.

Off. Prep.—Pilulæ Saponi Compositæ; Tinctura Pinus Pendulæ Composita.

JUNIPERUS SABINA.

Savin.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Diœcia Monadelphia.

THE TOPS AND LEAVES.

Description.—*Juniperus Sabina* is an evergreen, very compact shrub, growing from four to sixteen feet in height, with a disposition to spread horizontally rather than to form a stem. The *branches* are slender, round, tough, the bark of the young branches pale green, that of the trunk rough. The *leaves* very small, ovate, convex, dark-green, densely imbricated, erect, decurrent, opposite; the oppositions pyxidate. The *flowers* are diœcious. The *fruit* is a deep purple, almost black, ovoid berry, about the size of a whortleberry, smaller than that of *J. Communis.*—*L.*—*W.*

History.—This plant is indigenous to middle and southern Europe, and in the northern United States. The parts used are the tops and leaves; they have a powerful, peculiar, rather disagreeable odor, a bitter, acrid, biting taste, and yield their properties to alcohol, or hot water in infusion. Desiccation renders them of a lighter color. Gardes found them to contain volatile oil, resin, gallic acid, chlorophylle, extractive, lignin, and calcareous salts. In addition to these, Mr. C. H. Needles found fixed oil, gum, and salts of potassa.—*Am. Jour. Pharm. XIII.*, 15.

Properties and Uses.—Savin is emmenagogue, diuretic, diaphoretic and anthelmintic. In large doses it will produce gastro-enteritis. Care must be taken in its administration, as it may produce fatal results. It should never be given when there is any general or local inflammation present, and it should never be used during pregnancy, on account of its tendency to cause abortion; and, yet, notwithstanding this effect, it is reputed efficacious in checking the tendency to abort, and to be beneficial in menorrhagia, when carefully exhibited in small doses. The oil (*oleum sabinæ*), given two or three times a day, in doses of from ten to fifteen drops on sugar, will, in most cases, cause abortion, but it is apt to violently affect the stomach and bowels at the same time, bringing life into extreme danger. It is sometimes combined with oils of tansy, pennyroyal, or hemlock, as an emmenagogue and abortivant, and given in doses of from two to five drops. Sometimes, the leaves of Savin are combined with pink and senna, and given to remove worms; Savin oil will also frequently remove them, but we have more efficacious, and much safer remedies for this purpose. Externally, the leaves made into a cerate have been used as a stimulant to indolent ulcers, and to promote a discharge from blistered parts; mixed with an equal weight of verdigris, the powdered leaves have been used for destroying venereal warts. Dose of the powdered leaves, from five to twenty grains, three times a day; of the infusion, from half a fluidounce to two fluidounces.

Off. Prep.—Ceratum Sabinæ; Decoctum Sabinæ; Tinctura Caulophylli Composita; Unguentum Sabinæ.

JUNIPERUS VIRGINIANA.

Red Cedar.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Diœcia Monadelphia.

THE LEAVES AND EXCRESCENCES.

Description.—Juniperus Virginiana is a tree which attains the height of thirty-five feet or even more; its trunk varies from ten to fourteen inches in diameter, is straight and decreasing rapidly from the ground, giving off many horizontal branches; its surface generally unequal, and disfigured by knots, and the crevices and protuberances they occasion. The small twigs are covered with minute, densely imbricated leaves. These *leaves* are fleshy, ovate, concave, rigidly acute, with a small depressed gland on the middle of their outer side, growing in pairs which are united at the base to each other, and to the pairs above and below them. (A singular variety sometimes appears in the young shoots, especially those which issue from the base of the trees; this consists in an elongation of the leaves to five or six times their usual length, while they become spreading, acerose, remote from each other, and irregular in their insertion, being either opposite or ternate; such shoots are so dissimilar to the parent tree, that they have repeatedly been mistaken for individuals of a different species. The *barren flowers* grow in small oblong aments, formed by peltate scales with the anthers concealed within them. The fertile flowers form a small roundish galbus, with two or three seeds, covered on its outer surface with a bright blue powder.—*L.*—*B.*

History.—The Red Cedar is a tree which inhabits almost all parts of the United States, especially the southern, preferring dry, rocky situations and barren soils. It is evergreen, growing very slowly, and flowering in April and May. The internal wood is of a dull reddish hue, fine-grained, and compact, very light and durable, and is much used for tubs, pails, lead-pencils, fences, etc. The parts used are the leaves and twigs; they have a characteristic, rather agreeable odor, and a peculiar, somewhat acrid and amarous taste. Their virtues are taken up by alcohol or ether, and are due to an essential oil. The leaves are often confounded with those of the *Juniperus Sabina*, which have an entirely different smell. According to Jenks, the leaves yield gum, albumen, volatile oil, tannic acid, resin, bitter extractive, chlorophylle, fatty matter, woody fiber, etc.—*Am. Jour. Pharm. XIV.*, 235. Excrescences are frequently formed on the branches, known as *Cedar apples*, and occasioned, like galls, by the pricking of an insect; they have a somewhat agreeable odor, and an austere taste. These are sometimes powdered, and administered successfully as a vermifuge, the dose being from half a scruple to half a drachm, in some convenient vehicle, and repeated every four hours through the day.

Properties and Uses.—Same as the *Juniperus Sabina;* less energetic, but used in the same diseases; also in scalding of urine, and derangement of the kidneys and bladder, with spearmint and marsh-mallows. The oil makes a valuable external stimulating application for rheumatic pains, bruises, etc. Dose of the leaves, from one to two drachms; of the oil, from ten to fifteen drops.

The excrescences or *cedar apples*, as they are called, which are sometimes found on the tree, are decided anthelmintics. The following makes a pleasant and excellent vermifuge and tonic, for pale, sickly children; I have used it with much success in hundreds of cases: Take of cedar apples one pound; of black alder berries (*Prinos Verticillatus*), one pint by measure; digest these for fourteen days, in one quart of alcohol and one pint of molasses. The more recent the articles, the better. Dose, one fluidrachm, three times a day, for a child one or two years old; it is laxative, tonic and vermifuge.

Off. Prep.—Linimentum Olei.

KALMIA LATIFOLIA.

Sheep Laurel.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This plant is known by various names in different sections of the country, as *Laurel*, *Lambkill*, *Ivy*, *Big-leaved Ivy*, *Spoonwood*, *Calico-bush*, *Mountain Laurel*, etc. It is a beautiful shrub, from four to eight feet high, sometimes attaining the height of a small tree, with crooked *stems* and a rough *bark*. The *leaves* are irregularly alternate and ternate, evergreen, coriaceous, very smooth, with the under side somewhat paler, ovate-lanceolate, acute at each end, entire, on long petioles at the ends of the branches, and from two to three inches long. The *flowers* are numerous, white or variously tinged with red, very showy, clammy, and are disposed in splendid terminal, viscid-pubescent, simple or compound *corymbs*, with opposite branches. *Pedicels* glutinous, pubescent, with ovate, acuminate bracts. *Calyx* small, five-parted, persistent, with oval acute segments. *Corolla* large, monopetalous, with a conical tube, a cyathiform limb, and an erect, shallowy five-lobed margin; at the circumference of the limb, on the inside, are ten niches or pits, accompanied with corresponding prominences on the outside; in these depressions the anthers are found lodged at the time when the flower expands. The *stamens* are ten, hypogynous, bent outwardly so as to lodge their anthers in the niches of the corolla, but liberating them during the period of flowering and striking against the sides of the stigma; *anthers* two-celled, with two terminal pores. The *ovary* is roundish, supporting a slender, declinate *style* longer than the corolla; *stigma* obtuse. *Fruit* a dry capsule, which is roundish, depressed, five-celled, five-valved, the valves alternating with the divisions of the calyx. The *seeds* are numerous and minute.—*L.*—*W.*—*B.*—*R.*

History.—Sheep Laurel inhabits most parts of the United States, on rocky hills and elevated grounds, and in damp soil, sometimes forming a dense thicket, with a profusion of beautiful rose-colored flowers which appear in June and July, forming a contrast with its dark, glossy green leaves. The leaves are reputed to be poisonous to sheep and several other animals, killing them; while others again, as deer, goats, and partridges, feed upon them without any unpleasant consequences. When partridges which have eaten the laurel leaves, have themselves been cooked and eaten, they are said to have occasioned sickness at stomach, headache, impaired vision, difficult breathing, coldness of the surface and extremities, and other symptoms similar to those caused when putrid meats are eaten. An emetic of mustard with warm water has relieved some of the above symptoms, by removing the poison from the stomach. It is very doubtful, however, whether these symptoms were caused by the poisoned flesh of the birds, as numerous persons eat partridges that have fed on these leaves, without the least inconvenience. The presumption is that the poisonous character of the flesh was caused by its putrid or decomposed condition. The Indians are said to have used the expressed juice of the leaves, or a strong decoction, for the purpose of committing suicide. The leaves are the officinal parts, and yield their virtues to alcohol or water. They contain, according to Mr. C. Bullock, fatty matter, resin, tannic acid, gum, a body somewhat like mannite, chlorophylle, wax, albumen, an acrid substance, extractive, yellow coloring matter, and various salts.—*Am. Jour. Pharm.*, *XX.*, *p.* 264.

Properties and Uses.—In immoderate doses, Sheep Laurel is a poisonous narcotic, producing the symptoms above named, with diminished circulation. In medicinal doses, it is antisyphilitic, sedative to the heart, and somewhat astringent. Internally, either in powder, decoction, or tincture, it is an efficacious remedy in primary or secondary syphilis, and will likewise be found invaluable in febrile and inflammatory diseases, and hypertrophy of the heart, allaying all febrile and inflammatory action, and lessening the action of the heart. In active hemorrhages, diarrhea, and flux, it has been employed with excellent effect. I have extensively used this agent, and regard it as one of our most efficient agents in syphilis; and have likewise found it very valuable in inflammatory fevers, jaundice, and ophthalmic neuralgia and inflammation. The remedy must always be used with prudence, and should any of the above-mentioned symptoms appear, the dose must be diminished, or its use suspended for a few days. In cases of poisoning by this article, stimulants, as brandy, whisky, etc., must be given, with counter-irritation to the spine and extremities. Sheep poisoned by eating the leaves, have been saved by administering a gill or two of whisky to them. Externally, the fresh leaves stewed in lard, or the dried leaves in powder mixed with lard to form an ointment, are said to be beneficial in tinea-capitis, psora, and other cutaneous affections. Some time since I treated a case of syphilis of five weeks' standing, which had not received any kind of treatment during that period. The patient, at the time I first saw him, had several chancres, the surface of the body and head was covered with small red pimples, elevated above a jaundiced skin, and he was in a very debilitated condition. I administered a saturated tincture of the leaves of Kalmia, and touched the chancres with a tincture of muriate of iron, and effected a cure in four weeks, removing the jaundice at the same time. The saturated tincture of the leaves is the best form of administration; it may be given in doses of from ten to twenty drops, every two or three hours; the decoction may be given in doses of from half a fluidounce to a fluidounce; and of the powdered leaves from ten to thirty grains. A salve made of the juice of the plant, forms an efficient local application for rheumatism. There are other species of Kalmia, as *K. Glauca* or Swamp Laurel, and *K. Angustifolia*, or Narrow-leaved Laurel, which possess similar properties. The *K. Angustifolia* is supposed by some to be the best of the species for medicinal use.

Off. Prep.—Decoctum Kalmiæ; Syrupus Phytolaccæ Compositus; Tinctura Kalmiæ.

KINO.

Kino.

THE CONCRETE JUICE OF PTEROCARPUS MARSUPIUM, AND OTHER SPECIES.

Description.—For a long time the origin of Kino was unknown, but it has recently been ascertained to be the product of a lofty tree, growing upon the mountains of the Malabar coast of Hindostan, named *Pterocarpus Marsupium*, belonging to the *Natural Order* Fabaceæ. It has an erect, very high *trunk*, rarely straight. The outer layer of *bark* is brown, spongy, falling off in flakes, and the inner is red, fibrous, and astringent. The *branches* are spreading, horizontal, numerous, extending far. The *leaves* are sub-bifarious, alternate, pinnate with an odd one, eight or nine inches long; *leaflets* five, six, or seven, alternate, elliptic, emarginate, firm, deep-green and shining above, less so below, from three to five inches long, and two or three broad. The *petioles* are round, smooth, waved from leaflet to leaflet, and five or six inches long; *stipules* none. *Panicles* terminal, very large; ramifications bifarious, like the leaves. *Peduncles* and *pedicels* round, a little downy. *Bracts* small, caducous, solitary below each division and subdivision of the panicle. *Flowers* very numerous, white, with a small tinge of yellow. *Vexillum* with a long slender claw, very broad; sides reflexed, waved, curled, veined; *keel* two-petaled, adhering slightly for a little way near the middle, waved, etc., same as the vexillum. *Stamens* ten, united near the base, but soon dividing into two parcels of five each; *anthers* globose, two-lobed. *Ovary* oblong, pediceled, hairy, generally two-celled; *cells* transverse, and one-seeded. *Style* ascending. *Legume* on a long petiole, three-fourths orbicular, the upper remainder, which extends from the pedicel to the remains of the style, is straight, the whole surrounded with a waved, veiny, downy, membranous wing, swelled, rugose, and woody in the center, where the seed is lodged, not opening; generally one but sometimes two-celled. *Seeds* single, reniform.—*L.*

History.—Kino is the juice of the tree obtained by making longitudinal incisions in the bark; it flows abundantly, and of a red color, and by drying it in the sun it cracks into irregular angular masses, which are placed into wooden boxes for exportation. It usually reaches this country by way of England, being originally imported from Bombay or Tellicherry. East India Kino is in small pieces, pulverulent, of an irregular angular form, shining, of a deep ruby color, ultimately acquiring a brownish shade by atmospheric exposure, inodorous, and of a rough astringent taste, followed by a certain degree of aromatic sweetness. It burns without fusion or softening, and with but little flame and frothing, leaving a scanty gray ash. Boiling water dissolves a large proportion of it, forming, when cold, a permanent intense blood-red solution; and which yields, with sesquichloride of iron, a dark-green, coarsely flocculent precipitate, which is so abundant as to render the whole liquid pulpy. Acetate of lead affords a gray precipitate, and tartar emetic a gradually formed lake-red muddy jelly. Cold water forms with it a clear cherry-red solution, leaving a crumbly, grayish residuum. Alcohol dissolves about two-thirds of it, and forms a deep, brownish-red tincture, which is not disturbed by water. By long standing the tincture gelatinizes, and becomes less astringent. Proof-spirit is a less complete solvent, but the tincture is less apt to gelatinize. Its solubility in water is facilitated by alkalies, but its astringency is thereby lost, and its general characters changed. Chewing Kino softens it, rendering it slightly adhesive, and coloring the saliva red. Vauquelin found 75 per cent. of tannic acid in Kino, with red gum and an insoluble substance. Henning found, in East India Kino, Kinoic acid, tannic acid and a trace of gallic acid, pectin, ulmic acid, and inorganic salts with an excess of earthy bases.—*Archiv. der Pharm., Feb.*, 1853. The mineral acids, and solutions of gelatine, emetic tartar, acetate of lead, sesquichloride of iron, and nitrate of silver, produce precipitates with the watery infusion of Kino.—*P.*

There are many other exudations known in commerce as Kino, some of which are used principally for the purpose of adulterating the finer sorts; among the most important are the African Kino, Dhak-tree Kino, Botany Bay Kino, Jamaica Kino, and South American Kino.

The *African Kino*, is at present very rarely seen in commerce; from specimens received from Mungo Park, when on his last journey, it was decided an exudation from the *Pterocarpus Erinaceus*, a tree growing in many districts of the Senegal, Nunez, and along the banks of the Gambia and other streams of West Africa.

The *Dhak-tree Kino* is the product of the *Butea Frondosa*, a magnificent leguminous tree of the East Indies. The juice naturally exudes from fissures in the branches of the tree, and concretes into red tears which become black under the action of the sun. They are irregularly angular, seldom so large as a grain of barley, apparently black and opaque, but really of an intense garnet-red color, transparent in thin pieces, and frequently have fibers of bark adhering to one of their faces. Their taste is very astringent, brittle when chewed, without adhering to the teeth, and tinge the saliva lake-red. Their chemical reactions and solubilities are similar to those of the East India variety. They contain from 73 to 90 per cent. of tannic acid, and might be safely substituted for ordinary Kino. It rarely reaches England, and has not been imported to America. It is termed *gum Butea.*

The *Botany Bay Kino*, first described by White in 1790, is the astringent inspissated juice of the Brown Gum-tree of New Holland (Eucalyptus Resinifera), a fine tall tree belonging to the *Nat. Ord.* Myrtaceæ, and *Sex. Syst.* Icosandria Monogynia. It yields a red juice from incisions, so profusely that sixty gallons may be collected from one tree. The juice concretes into a resinous-like substance, on the branches and trunk, which is at first reddish and translucent, but ultimately chocolate-colored and opaque. It is in irregular masses, free from impurity, generally covered with a reddish powder from attrition, compact, very brittle, deep brownish-black, resinous in luster, and opaque even in thin fragments. It is more bitter and less astringent than ordinary Kino, and tinges the saliva a dirty lake-red. It is easily powdered, the powder being of an umber color; softens and swells up by heat, and burns with a dense flame or white smoke before it becomes perfectly charred. Cold water does not readily act upon it, slowly acquiring a pale-yellowish tint after an hour or two, with but little change in the appearance of the Kino; boiling water dissolves considerable of it, forming a deep, cherry-red solution, which, on cooling, precipitates a copious brick-colored deposit, if the solution be made with one part of the Kino to twenty-five of water. The remaining solution is yellowish-brown, and yields a deep-green turbid fluid with sesquichloride of iron, and a grayish-yellow precipitate with acetate of lead. Alcohol dissolves it in large proportion, forming a deep yellowish-brown tincture. It is not so common in Europe as it was some years since, and is seldom seen in this country.

JAMAICA, or WEST INDIAN KINO, is presumed to be obtained from the *Sea-Side Grape* (Coccoloba uvifera), a tree belonging to the Natural Order, Polygonaceæ.—*C.* The tree inhabits the sea-coast of the West India islands and the adjoining coast of America. A decoction is prepared from the leaves, wood, and bark, which are excessively astringent, then evaporated, and the thick fluid poured into vessels, in which it solidifies upon cooling. Upon extracting it from the vessels containing it, it is readily reduced to pieces varying in size, generally about as large as a small cherry, and with a disposition to the orthogonal form. They are lighter colored, and less shining than the ordinary Kino, are impervious to light in bulk, but garnet-red and semi-transparent in thin fragments; are brittle and pulverable, forming a paler-colored powder than the commercial drug. They are inodorous, amarous and excessively astringent, impart a red hue to the saliva when masticated, and contain about 41 per cent. of tannic acid. Cold water, and alcohol, dissolves nearly the whole of West Indian Kino, about from 6 to 11 per cent. remaining undissolved.

The SOUTH AMERICAN, COLUMBIA, or CARACCAS KINO, is probably furnished by the same tree as the West India. It is rarely met with in this country, likewise probably derived from the *coccoloba uvifera.* It is imported in heavy masses, and closely resembles the Jamaica Kino in its several properties, excepting that it is nearly equally soluble in cold water and alcohol, is more free from any tenacious substance interfering with the filtration of its watery solution, and contains no resinous body.

An artificial Kino is made by boiling together logwood 48 pounds, tormentil root 16 pounds, madder root 12 pounds, water a sufficient quantity. To the decoction add 16 pounds catechu, and when dissolved, strain and evaporate to dryness. About 24 pounds of factitious Kino will be obtained.

Properties and Uses.—Kino is a pure and energetic astringent, and may be used to fulfill all the indications for which catechu is employed. It is not considered so efficacious in chronic dysentery as catechu, but is preferred internally in menorrhagia, and as a topical application in leucorrhea, relaxed sore-throat and aphthæ of the mouth or fauces. An infusion thrown into the nostril has suppressed hemorrhage from the Schneiderian membrane; and the powder on lint has suppressed a hemorrhage from a wound in the palate, which had resisted various means. Dose of the powder, from ten to thirty grains; of the tincture, from half a fluidrachm to two fluidrachms.

Off. Prep.—Pilulæ Camphoræ Compositæ; Tinctura Kino.

KRAMERIA TRIANDRIA.

Rhatany.

Nat. Ord.—Polygalaceæ, *De Candolle;* Krameriaceæ, *Lindley. Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—Rhatany is a suffruticose plant, with a horizontal, very long and branched *root*, with a thick bark, reddish-brown externally, and red internally. The *stem* is round, procumbent, much branched, taper; the *branches* are two or three feet long, when young white and silky, when old dark and naked. The *leaves* are alternate, sessile, oblong and obovate, acuminate, entire, hoary on each side. *Flowers* red, solitary, axillary, on short stalks. *Calyx* of four sepals, the inferior largest, silky externally, smooth and shining inside, of the color of lac. *Corolla* of four petals, the two upper separate, spathulate, the two lateral roundish and concave. *Stamens* three, hypogynous; *anthers* small, urceolate, with two openings at top; *ovary* ovate; style red, terminal; *stigma* simple. *Fruit* a dry, hairy drupe, burred with dull red hooks; *seeds* one or two.—*L.*

History.—This plant grows upon the dry, gravelly, and sandy hills in Peru, flowering all the year round. The natives had used it as a strong astringent long before its discovery by Ruiz in 1780. The root is the officinal part; it is dug up after the rains in large quantities, and after being well dried is exported, principally to Portugal, where it is employed to adulterate red wines. Sometimes an extract is prepared from it, which is exported and used in a similar manner. As imported, it consists of a short root-stock from half an inch to two inches in diameter; and several roots proper, which are simple or branched, one or two feet long, and between the thickness of a goosequill and that of a man's thumb. Its bark is dark brownish-red, wrinkled, and warty on the root-stock, brittle, inodorous, and of a strongly astringent and slightly bitterish taste. The woody interior is yellowish-red, dense, tough, and of the same taste, but much weaker. Cold water, rectified, or proof-spirit, readily extracts its active constituents. In powder it is of a reddish color. The bark contains more of the medicinal virtues than the ligneous or woody part. If the root be macerated in water at 212° F., its medicinal properties will be extracted, but as a little starch and some colored extractive or apotheme will also be dissolved, the infusion, when cool, will become muddy, and after a time the above inert substance will be deposited. Boiling will extract still more of this matter, and the tannic acid of the root being oxygenated by the action of the air, loses all its therapeutical influences. A cold infusion, or an extract from the cold infusion, are the best forms for use. By placing the powdered root in a displacer, and passing water through, a brick-red aqueous solution is obtained, possessing all the medicinal qualities of the root, and from which an excellent extract may be procured by a quick, but cautiously conducted evaporation. The tincture of Rhatany contains, in addition to the astringent principles of the root, a considerable amount of its colored extractive. Peschier found the root to contain tannic acid 42.6, gallic acid 0.3, gum, extractive, and coloring matter 56.7, krameric acid 0.4. Its *incompatibilities* are similar to those of tannic acid.—*P.*—*C.*

A false Rhatany has been met with, the source of which is unknown; compared with the true Rhatany, its twigs are smoother and slightly shining, having also deeper furrows and transverse depressions of an annular form. It is not so tough, breaks more easily and with a short fracture; its bark is thicker and adheres firmly to the wood, is lighter colored on its inner surface, and has a glistening aspect when cut with a sharp knife. The center, when cut through, is of a dull, pale-red color, and without the dark points met with in the true root. It is inodorous, more strongly astringent in taste than the genuine Rhatany, and gives more abundant precipitate with chemical reagents.—*Pharm. Jour. and Trans.*

Properties and Uses.—Rhatany is a powerful astringent, with some slight tonic virtues. It may be employed internally with advantage, in menorrhagia, hematemesis, passive hemorrhages, chronic diarrhea, leucorrhea, chronic mucous discharges, colliquative perspiration, and incontinence of urine. Also as an energetic styptic in epistaxis, hemorrhage from the cavity of an extracted tooth, or the surface of a wound, and as a local application to prolapsus ani, fissure of the anus and leucorrhea. As an application to spongy and bleeding gums, to redden and consolidate them, as well as to preserve the teeth, the following paste will be found unsurpassed: Take of prepared chalk, and powdered cinchona, of each, equal parts; combine them with a sufficient quantity of equal parts of the tinctures of Rhatany and myrrh, to form a paste. Use daily with a brush. Dose of powdered Rhatany from ten grains to thirty; of the tincture from one to four fluidrachms; of the infusion from one to four fluidounces; of the extract from ten to twenty grains.

Off. Prep.—Extractum Krameriæ; Infusum Krameriæ; Tinctura Krameriæ.

LACTUCA SATIVA.

Lettuce.

LACTUCA VIROSA.

Strong-scented Lettuce.

Nat. Ord.—Asteraceæ; Cichoraceæ, *Lindley*. Compositæ Cichoraceæ, *De Candolle*. *Sex. Syst.*—Syngenesia Æqualis.

THE HERB, AND INSPISSATED JUICE—LACTUCARIUM.

Description.—Lactuca Sativa has an annual, tap-shaped *root*, with a corymbose *stem* two or three feet in height, and suborbicular *leaves;* the cauline ones cordate. The *heads* are numerous, small, with yellowish corollas.—*W.* It is not so rank in odor as the L. Virosa, has no blood-red spots on its stems, and no prickles on the keel of its leaves. Previous to the appearance of the flowering stems, the garden Lettuce contains a pleasant, sweet, watery juice, and in this condition the plant is employed as a salad; but in both species, no sooner does the flowering-stem rise above the early leaves than the juice grows milky, very bitter, and of a strong, peculiar, rank odor, not unlike that of opium.

LACTUCA VIROSA has a tap-shaped *root*, with a solitary stem, two or three feet high, erect, round, smooth, sparingly leafy, scarcely branched; panicled at the top; a little prickly below. The *leaves* are horizontal, nearly smooth, finely toothed; radical ones numerous, obovate, undivided, depressed; those of the stem smaller, often lobed; arrow-shaped and clasping at their base; the midrib of all more or less beset underneath with prominent prickles; such as often occur on the margin also. *Flower-heads* numerous, panicled, with abundance of small heart-shaped, pointed bracteas. *Involucral scales* downy at the tip, destitute of any keels or ribs. *Corolla* small, light-yellow. *Pappus* rough.—*L.* There are many varieties of Lettuce; they all have large leaves, often corrugated, and containing more or less of a whitish juice, the lactucarium. Their *stems* are round, corymbose at the summit; the *leaves* suborbicular and runcinate, *cauline ones* cordate or obovate; *flowers* yellow.

History.—Lactuca Sativa is supposed to be a native of the East Indies; it is extensively cultivated in Europe and this country. The *L. Elongata* of our country was presumed for a time to possess narcotic principles similar with the others, but on investigation this has not proved to be the case. *Lactucarium* or Lettuce-opium is obtained from the officinal plants "by cutting the stem of the Lettuce at the time of flowering, imbibing the milky juice that flows out by a sponge or by cotton, and squeezing it out into a vessel containing a little water. It is then left in a dry place till it concretes into a solid mass."—*Thompson's Org. Chem.* By making another cut at a short distance below the first, and so proceeding several times daily, the whole of the juice contained in the plant may be collected. There are several other modes recommended for procuring the lactucarium, but no one of them obtains an article equal to that collected by the above plan. After the middle period of inflorescence, the juice becomes thicker but deteriorated in its medicinal principles. A single plant of *L. Sativa* is said to yield seventeen grains of lactucarium, while a plant of *L. Virosa* gives fifty-six grains. As found in the shops, lactucarium is in roundish, compact, rather hard masses, weighing several ounces, of a reddish-brown color externally, of a bitter, narcotic and somewhat acid taste, and an odor approximating that of opium. It is asserted that two other varieties, the *L. Scariola*, and *L. Altissima*, furnish a superior article of Lettuce-opium.

Lactucarium does not absorb moisture from the atmosphere; is softened by heat, and at a high temperature burns with a large white flame. Cold water takes up about a sixth of it, forming a deep-brown infusion; boiling water a third, and proof-spirit, alcohol and ether a much larger proportion. The addition of acetic acid to water or alcohol improves their solvent powers upon this article. It contains neither morphia nor narcotine, but is found to consist of *lactucin*, volatile oil, a yellowish-red tasteless resin, a greenish-yellow acrid resin, crystallizable and uncrystallizable sugar, gum, pectic acid, albumen, a brown basic substance, a principle like humus-extractive, a concrete oil or wax, one part of which is soluble in ether, and fusible only at 212°, and the other insoluble in ether and fusible at 167°, and numerous salts, particularly oxalates. Buchner has given the following estimate, founded on an analysis by Ludwig: Lactucin, odorous matter, asparamide, two vegetable acids, oxalic acid, mannite, albumen, insoluble vegetable substances, lactucerin, waxy matter and soft resin, gummy matter, protein, and water.—*P.*

Lactucin is obtained by treating finely-powdered lactucarium with alcohol acidulated with one-fifteenth of acetic acid, adding an equal volume of water, and precipitating the mixture with a slight excess of subacetate of lead; filter the solution and free it from the lead by sulphureted-hydrogen gas, filter, evaporate by a gentle heat not exceeding 144°—treat the extract with absolute alcohol, then distill it off, and again exhaust with ether, which by distillation or spontaneous evaporation, forms crystals of an obscure acicular character. When pure they are colorless, inodorous, intensely bitter, easily fusible, soluble in sixty or eighty parts of cold water, more soluble in ether, still more so in alcohol, and easily soluble in acids, especially acetic acid, but without neutralizing them. In regard to this being the active principle of lactucarium, there is yet much dispute; several analysts have differed in their results and conclusions. The most recent analysis is by Ludwig, who in connection with several other principles, obtained *lactucic acid* and *lactucin.* He rubbed together for half an hour, eighty parts of finely powdered lactucarium with eighty parts of pure cold diluted sulphuric acid, and then added to the mixture four hundred parts of alcohol, sp. gr. 0.851; the resulting liquid was filtered, slaked lime added to it to precipitate the sulphuric acid, animal charcoal added to decolorize it, and finally evaporated. The brown viscid alcoholic extract thus procured was digested in boiling water, filtered, the filtrate treated by animal charcoal, again filtered, and evaporated. The residue was dissolved in boiling water, which deposited white crystals of lactucin on cooling; a subsequent evaporation, after all the lactucin had been deposited, yielded lactucic acid. *Lactucin*, the bitter principle of lactucarium, is a colorless, odorless, crystallizable, fusible, neutral substance. It dissolves in from 60 to 80 parts of water, is slightly soluble in ether, readily so in alcohol; its aqueous solution is not affected by acetate of lead, chloride of iron, solution of iodine, or nitrate of silver; mixed with sulphate of copper and soda, and heated to 212° it reduces the oxide of copper to the state of protoxide. *Lactucic acid* is light yellow, very bitter, soluble in water and alcohol, and does not readily form into crystals. *Thridace*, is the inspissated expressed juice obtained by collecting the stalks near the flowering period, depriving them of their leaves, and then subjecting them to pressure.

Properties and Uses.—Lactucarium has never been thoroughly and satisfactorily investigated in relation to its therapeutical influences; indeed, various experimenters differ in their views on this point, some asserting it to be a stimulant and others a sedative. It is, when employed at all, usually given as a calmative and hypnotic, and as a substitute for opium, to which it is to be preferred in many instances, on account of its freedom from unpleasant after-effects, as constipation, excitement of the brain, etc. However, it is not considered equal in power to opium. The most energetic lactucarium is said to be obtained from *L. Virosa*, and *L. Altissima.* Moderate doses of it act as a narcotic poison on the lower animals, and ten or twenty grains swallowed by a dog will cause sleep, or the watery solution injected into a vein occasions sleep, coma, and death. Dose of lactucarium in pill or powder, which is the most efficient mode of administration, from five to twenty grains; of the tincture, thirty to sixty drops; of the alcoholic extract, one to five grains. The article is seldom used in medical practice on account of its high price, its uncertain power, and its liability to adulteration.

LARIX AMERICANA.

Tamarac.

Nat. Ord.—Pinaceæ or Coniferæ. *Sex. Syst.*—Monœcia Monadelphia.

THE BARK.

Description.—This is the Pinus Pendula, Pinus Microcarpa, and Abies Americana of various botanists, and is known by the several names of *Black Larch*, *American Larch*, *Hackmetack*, etc. The tree has a straight and slender *trunk*, with slender horizontal branches and attains the height of eighty or a hundred feet. The *leaves* are short, one or two inches long, very slender, almost thread-form, soft, deciduous, without sheaths and in fascicles of from twenty to forty, being developed early in the spring from lateral scaly and globular buds, which produce (the same or the second year) growing shoots on which the leaves are scattered. The *cones* are oblong, of few rounded scales, inclining upward, from half an inch to an inch in length, and of a deep purple color. *Scales* thin and inflexed on the margin. *Bracts* elliptical, often hollowed at the sides, abruptly acuminate with a slender point, and together with the scales, persistent.—*W.*—*G.*

History.—This is a beautiful tree, more common throughout New England; it is found in swamps and moist places, and flowers in April and May. It may be distinguished from the pines, by the branches being without leaves for nearly half the year. Its wood is very heavy, strong and durable, and is the most valuable of all the pines or spruces. The bark is the part used as medicine.

Properties and Uses.—A decoction of the bark of this tree is said to be laxative, tonic, diuretic, and alterative, and is recommended in obstructions of the liver, rheumatism, jaundice, and some cutaneous diseases; a decoction of the leaves has been employed in piles, hemoptysis, menorrhagia, diarrhea, and dysentery, and externally in cutaneous diseases, ulcers, burns, etc. In dropsy, combined with spearmint, juniper berries and horseradish, it has proved valuable. Dose of decoction, from two to four fluidounces, two to four times a day.

Off. Prep.—Tinctura Pinus Pendulæ Composita.

LAURUS SASSAFRAS.

Sassafras.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Enneandria Monogynia.

THE BARK OF THE ROOT.

Description.—This is a small indigenous tree, varying in height from ten to forty feet, with a trunk about twelve inches in diameter; the *bark* is rough and grayish, that of the twigs smooth and green. The *leaves* are alternate, petiolate, membranous, bright green, smooth above, finely downy beneath, very variable in form, some being obovate, others deeply three-lobed, and some lobed only on one side, all, however, tapering in a wedge-like manner into the petiole. The *flowers* appear before the leaves, are small, greenish-yellow, and in terminal and axillary, corymbose racemes, with linear bracts. The *calyx* is six-parted, membranous, permanent at base. *Male flowers* nine stamens; *females* six; *style* simple. *Fruit* an oval, succulent drupe rather larger than a pea, bright-blue, upon red, clavate peduncles.—*L.*

History.—Sassafras is a well-known tree common to the woods of North America, from Canada to Florida, and flowering in the latter part of April or early in May. The odor of the flowers is slightly fragrant, and they, together with the leaves and young branches, are used in decoction, in many parts of the country as a spring medicine to cleanse the blood. The root bark and the pith are the officinal parts. The root is composed of a light, porous, grayish-yellow wood, having an external rough bark, which is spongy and separable into layers, grayish-brown externally, and rusty-brown, or reddish-cinnamon brown on its inner surface; both the wood and the bark are officinal in Europe. The bark of the root is the part generally employed in this country, it is by far the most active part of the whole tree. In commerce it is met with in pieces of various sizes, color as above, friable, of an agreeable aromatic odor which, however, diminishes by age, and a strong, peculiar, warm, aromatic, sweetish taste. Its virtues are due to a yellow essential oil, which may be separated by distilling from water. Hot water, in infusion, or alcohol, takes up the active principles of the bark, but boiling dissipates them. Dr. Reinsch states that the bark contains water, heavy essential oil, light essential oil, tallowy matter, balsamic resin, a camphorous substance, wax, *sassafrid* (a principle somewhat like tannic acid), gum, starch, tannic acid, albumen, red coloring matter, salts, etc.—*Am. Jour. Pharm. XVIII.*, 159. The pith of the extremities of the branches is a light, porous, mucilaginous substance, with a slight taste of the bark. Added to water, it forms an adhesive mucilage, which is not soluble in alcohol. M. Faltin found that during the action of chlorine gas upon oil of sassafras, the latter becomes converted into a tough, thick mass, and a large amount of hydrochloric acid is formed. After neutralization with milk of lime, this mass furnishes, on distillation, a small quantity of camphor, perfectly identical in all respects with common camphor.

Properties and Uses.—Sassafras is a warm aromatic stimulant, alterative, diaphoretic, and diuretic. It is generally used in combination with other alteratives whose flavor it improves, in syphilitic affections, chronic rheumatism, scrofula, and many cutaneous eruptions. The mucilage of the pith is used as a local application in acute ophthalmia, and as a demulcent drink in disorders of the chest, bowels, kidneys, and bladder. The oil is used to afford relief in the distressing pain attending menstrual obstructions, and that following parturition, in doses of from five to ten drops, on sugar; also used in diseases of the kidneys and bladder. Externally, as a rubefacient, in painful swellings, sprains, bruises, rheumatism, etc., and is said to check the progress of gangrene.

Off. Prep.—Infusum Sassafras Medullæ; Lotio Sassafras; Pilulæ Saponi Compositæ; Syrupus Sarsaparillæ Compositus.

LAVANDULA VERA, AND LAVANDULA SPICA.

Lavender.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE FLOWERS.

Description.—*Lavandula Vera*, of De Candolle, is a small shrub generally one or two feet high, but sometimes growing to even six feet. The *leaves* are oblong-linear or lanceolate, entire, opposite, sessile, when young hoary and revolute at the edges. The *flowers* are of a lilac color, small, in terminal, cylindrical spikes, formed of interrupted whorls of from six to ten flowers, each whorl with two minute bracts. The *corolla* is tubular, two lipped, the upper lip large and two-lobed, the lower three-lobed. *Floral leaves* rhomboid-ovate, acuminate, membranous, all fertile, the uppermost shorter than the calyx. *Stamens* four, declinate; *anthers* reniform, one-celled; *style* slender; *stigma* bilobate.—*L.*

LAVANDULA SPICA of De Candolle is more dwarfish and more hoary than the last. The *leaves* are oblong-lanceolate, somewhat spathulate, entire, much narrowed at the base, hoary on both sides. *Spikes* somewhat interrupted. *Bracts* linear-subulate, shorter than the calyx. This plant is not used in medicine, but yields what is called *Oil of Spike*, much used in the preparation of artistical varnishes and by porcelain painters.—*L.*

History.—Lavandula Vera inhabits southern Europe, growing in dry, sterile soils; it is largely cultivated in the United States, flowering in July and August. It is subject to a disease, which can only be avoided by not allowing the plants to grow too closely together. The whole plant is aromatic. The flowers are the parts used, they are gathered shortly after their appearance, and carefully dried. They have a rich peculiar fragrance, which is retained long after drying, and a strong, bitter, aromatic, somewhat camphoraceous taste. Their properties are yielded to alcohol or ether. They contain a volatile oil, resinous matter, tannic acid, a bitter principle, and woody fiber. A pound of the recent flowers yields from half a drachm to two drachms of the volatile oil.

Properties.—Lavender is a tonic, stimulant, and carminative; it is seldom given in its crude state, but in its officinal preparations, which see.

Off. Prep.—Oleum Lavandulæ; Tinctura Lavandulæ Composita.

LEDUM LATIFOLIUM.

Labrador Tea.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—Ledum Latifolium is an evergreen shrub, with an irregularly branched *stem* from two to five feet in height; the *branches* are woolly. The *leaves* are alternate, subsessile, entire, one or two inches in length, and nearly one-third as wide, obtuse, elliptical or oblong, smooth above, clothed with a dense, rusty wool beneath, with revolute or replicate margins. The *flowers* are large, white, in dense terminal corymbs of about a dozen flowers; *pedicels* nearly as long as the leaves, filiform, pubescent. *Calyx* very minute. *Corolla* white, and consists of five spreading, obovate, obtuse petals. *Stamens* five or ten, as long as the petals; *filaments* slender, smooth; *anthers* small, opening by two simple terminal pores. *Ovary* roundish; *style* straight, about as long as the stamens; *stigma* small, obtuse. *Capsule* ovate-oblong, subpubescent, five-celled, five-valved; *valves* splitting from the base upward, with the margins inflexed and connivent; *receptacles* linear, extending into the cells of the capsule. *Seeds* minute, terminating in a membrane at each extremity.—*L.*—*Torrey.*

History.—This plant is a native of North America, and is found in the northern parts of the United States and in Canada, growing in cold bogs, and damp mountain woods, flowering in June and July. It is also found further south growing on the mountains. The leaves are the parts used, they have a pleasant flavor, and yield their virtues to hot water in infusion, or to alcohol. They were much employed instead of tea-leaves, during the Revolutionary war. *Ledum Palustre*, or Marsh Tea, inhabits sphagnous swamps in the cold regions of the two continents, and may be distinguished by its linear leaves, having uniformly ten stamens, and especially by its oval pods. The leaves have a pleasant, resinous odor, and a not unpleasant, amarous, and somewhat spicy taste, with slight astringency. They have not been satisfactorily analyzed, but appear to contain tannic acid and some essential oil. Water by infusion, or alcohol extracts its properties.

Properties and Uses.—Ledum Latifolium is pectoral and tonic; and is useful in coughs, irritations of the pulmonary membranes, and in dyspepsia. Reputed also to possess similar but less energetic properties than the

Ledum Palustre, which is supposed to possess narcotic powers. An infusion of the leaves has been successfully employed in decoction in pertussis, dysentery, and to allay irritation in exanthematous diseases. In leprosy, itch, and several diseases of the skin, the decoction internally and externally has been beneficially used. Clothes, among which it is strewed, are said to be preserved from the ravages of moths. A strong decoction, used externally, will kill lice and other insects. Dose of the infusion of either of the above plants, from two to four fluidounces, three or four times a day.

Off. Prep.—Infusum Ledi.

LEONURUS CARDIACA.

Motherwort.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE TOPS AND LEAVES.

Description.—Leonurus Cardiaca is a perennial plant, with *stems* from two to five feet in height, wand-like, minutely downy, acutely quadrangular, with intermediate channels, purplish, and beset with numerous pairs of opposite, long-stalked, rough, dark-green, somewhat downy *leaves*, arranged in four vertical rows. The lower stem-leaves are palmate-lobed, and broadest; the upper ones acutely three-lobed; those about the summit lanceolate and undivided; all of them toothed, cuneiform at base. The *flowers* are purplish or whitish-red, and are disposed in numerous, axillary whorls. *Calyx* rigid and bristly. *Corolla* purplish, the upper lip clothed with dense, white, shaggy, upright hairs; the lower deeply colored, variegated, smooth, in three nearly equal entire lobes; the middle lobe obcordate. *Stamens* didynamous; *anthers* approximated in pairs, with parallel transverse cells and naked valves, and sprinkled with shining dots. *Achenia* oblong, ribbed, and roughened on the ribs, the apex prolonged into a very slender thread-like beak, bearing the pappus of copious soft and white capillary bristles.—*L.*—*W.*—*G.*

History.—Motherwort is an exotic plant, but extensively introduced into this country, growing in fields and pastures, and flowering from May to September. It is supposed to be a native of Tartary, and may probably be indigenous to the northern sections of this country. After blossoming, the inner involucre closes for a time, the slender beak elongates and raises up the pappus while the fruit is forming; the whole involucre is then reflexed, exposing to the wind the naked fruits with the pappus displayed in an open globular head. The root sends forth a number of small, long fibers of a dark-yellowish color. The whole plant is officinal. It has a peculiar, aromatic, not disagreeable odor, and a slightly aromatic, bitter taste, and yields its properties to water or alcohol. The plant has not been analyzed.

Properties and Uses.—Motherwort is emmenagogue, nervine, antispasmodic and laxative. It is usually given in warm infusion in amenorrhea from colds; and in suppressed lochia, we have found it superior to any other remedy. Likewise useful in hysteria. The extract is recommended in nervous complaints, pains peculiar to females, in irritable habits; delirium tremens, typhoid stages, with morbid nervous excitability, all chronic diseases attended with restlessness, wakefulness, disturbed sleep, spinal irritation, and neuralgic pains in the stomach and head, and in liver affections. Combined with Ictodes and Cimicifugin, it forms a superior antispasmodic, nervine and emmenagogue. Externally, it may be used as a fomentation to the bowels, in suppressed or painful menstruation, etc. Dose of decoction, from two to four fluidounces, every one, two or three hours; of the extract, from three to six grains, every two or four hours. The root in infusion is diuretic. The seeds have been given in half teaspoonful doses in water, in bilious colic, and, it is said, will pass through the bowels when quicksilver will not; they must not be pulverized. This, however, requires more satisfactory evidence.

Off. Prep.—Decoctum Leonuri; Extractum Leonuri Hydro-alcoholicum; Pilulæ Leonuri Compositæ.

LEPTANDRA VIRGINICA.

Leptandra.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Diandria Monogynia.

THE ROOT.

Description.—This is the *Veronica Virginica* of Linnæus, and is known also by the names of *Culver's Physic*, *Tall Speedwell*, *Blackroot*, etc. It is an indigenous, perennial plant, with a simple, straight, smooth, herbaceous *stem*, from two to five feet in height. The *leaves* are whorled in fours to sevens, short-petioled, lanceolate, acuminate, finely serrate, and glaucous beneath. The *flowers* are white, numerous, nearly sessile, and disposed in long, terminal, and verticillate, sub-terminal spikes. *Spikes* panicled, crowded; *bracts* very small. *Calyx* four-parted. *Corolla* small, nearly white, with a deeply four-cleft, spreading border, the lateral or lower segments narrower than the others, tubular, pubescent inside; *tube of the corolla* longer than its limb, and much longer than the calyx. *Stamens* two, very much exserted. *Capsule* oblong-ovate, not notched, opening by four teeth at the apex, many-seeded.—*G.*—*W.*

History.—This plant grows throughout the United States, in limestone countries, and in rich, moist places, woods, thickets, and barrens, and flowers in July and August. The root is perennial, horizontal, irregular, woody, about as thick as the finger, from six to twelve inches long, blackish externally, brownish internally, with many long, slender, dark fibers, issuing horizontally, in every direction. It is the officinal part, and should be gathered in the fall of its second year. When fresh it has a faint odor, and a bitter, nauseous taste, which is somewhat lessened by drying, and yields it properties to water at 212° F., or still better to alcohol. Age impairs its virtues. It has not been satisfactorily analyzed, but is said to contain an essential oil, bitter extractive, tannin, gum, resin, and woody fiber. Prof. E. S. Wayne has carefully examined this plant, and considers that the active principle of the root is due to its bitter principle; and from the minute quantity of the resinous matter found in it, there can be no doubt but that he is correct.

Properties and Uses.—The fresh root is too drastic and uncertain for medicinal use, producing vomiting, bloody stools, dizziness, vertigo, and in pregnant females abortion, unless used with much care. A decoction or extract of the fresh root is highly recommended in intermittent fever; Prof. Powell, who has tested it, states that it removes the disease, and leaves the system in a condition to repel a fresh attack or relapse; but it must be used with caution, as it is apt to produce unpleasant symptoms. The dried root is laxative, cholagogue and tonic, and is employed with much success in all hepatic affections, as it causes the liver to act with great energy, and without active catharsis. In all febrile diseases it is an excellent laxative, and may be given daily in tablespoonful doses of the infusion, repeated every hour, until one or two moderate evacuations are procured; it is peculiarly applicable to bilious and typhoid fevers, causing discharges of a black, tarry and morbid character, without debilitating the tone of the bowels or of the general system. It has been successfully employed in leprosy and cachetic diseases, and its effects in these instances may, probably, be owing to its influence on the biliary apparatus. As a laxative and tonic in small doses, it is very valuable in dyspepsia, especially when connected with an inactive condition of the liver, and torpid and debilitated bowels, likewise in all functional diseases of the liver, as above remarked. It exerts a powerful influence upon the absorbent system, and in combination with cream of tartar, has been successfully used in obstinate cases of dropsy. In diarrhea and dysentery, it has proved very beneficial as a cathartic, one active dose frequently effecting a cure.

The following powder is highly esteemed in some sections of country as a remedy in dysentery and diarrhea: Take of Leptandra root, in powder, one drachm, opium, capsicum, each half a drachm; mix. The dose is three or four grains every two, three, or four hours, until the disease yields. In some cases, the quantity of opium may be lessened one-half. By some it is said to possess narcotic properties, and that, during its operation, it will frequently be necessary to rouse the patient lest he fall into a deep sleep. I have never witnessed this effect. Dose of the powdered root as a cathartic, from twenty to sixty grains, which may be given in sweetened water; of the infusion, in typhoid stages, half a fluidounce every hour until it operates, and to be repeated daily. Dose of the hydro-alcoholic extract, which is its best form of administration, from one to five grains in form of pills.

Off. Prep.—Extractum Leptandræ Hydro-alcoholicum; Extractum Leptandræ Fluidum; Leptandrin; Tinctura Leptandræ.

LEPTANDRIN.

Leptandrin.

THE RESINOUS PRINCIPLE OF LEPTANDRA VIRGINICA.

Preparation.—Leptandrin may be prepared as follows: Take of coarsely-powdered Leptandra any quantity, alcohol 90 per cent., a sufficient quantity. By percolation, obtain a saturated tincture. Place the tincture in a still, and distill off the alcohol, and while hot add the residuum slowly and gradually to cold water, equal to two or three times its volume. Allow this to stand for seven or eight days, when the resinous matter will precipitate to the bottom of the vessel in a semi-liquid mass, while the water will hold in solution most of the extractive and coloring matter. Remove this water, and to the residue add a fresh supply of cold water, subjecting it to another washing. Then carefully remove the water, after having allowed all the resinous matter to precipitate, which last must be dried in shallow tin or porcelain plates by a moderately-continued heat, until it becomes perfectly friable on cooling, and which generally requires several days. In the preparation of this article, high-proof alcohol must be employed, on account of the large amount of extractive matter present, which is soluble in water, and which, according to the proportion of water present in the tincture, prevents the precipitation of the Leptandrin. Care must be taken likewise in the application of heat, as too great a heat, say above 175° or 180° will render the precipitate inert, or materially affect its character. The above is the process usually employed in the preparation of Leptandrin; it may be obtained, however, by adding the tincture to four times its weight of water, distilling off the alcohol, and setting aside the residue for several days, until all the Leptandrin precipitates. Remove the water, and dry the precipitate as above, having previously washed it in fresh water to remove extractive, etc. Roots of the second year's growth are said to afford the most Leptandrin.

History.—Leptandrin, according to its mode of preparation, is a jet-black resinous substance, resembling pure ashphaltum, or of a grayish-brown color, with a peculiar, faint, cyanic smell and taste, somewhat bitter, but not disagreeable. In its aggregate form, it has a vitreous fracture, is unalterable in a dry atmosphere, and is without acid or alkaline reactions. Its powder has a black, glistening, soot-like appearance, and coalesces in a warm and moist air. When first made it is soluble in alcohol, though as with many other resins upon exposure to atmospheric influence, it becomes imperfectly soluble in alcohol, but perfectly so upon the addition of aqua ammonia. It is insoluble in water, but the addition of liquor potassa or aqua ammonia, renders it completely soluble, from which solutions it is precipitated by acids. Ether takes up a portion of it, and aqua ammonia added, perfectly dissolves it, leaving the ether floating above of a light reddish-yellow color. It is lighter than chloroform, and is insoluble in it. Spirits of turpentine takes up a small portion, forming a dirty-white liquid; acetic acid likewise dissolves a small proportion. None of the above agents have been tried with heat. Nitric acid turns Leptandrin a brownish-yellow color; muriatic acid, a light yellowish-green; and sulphuric acid, reddish-brown. Heat semi-liquifies it, and it burns with a bright white flame, giving out a sweet, balsamic, rather agreeable odor, somewhat resembling balm of Gilead buds when burned, or incense. This valuable agent was first prepared and introduced to the profession by W. S. Merrell, of Cincinnati.

Prof. E. S. Wayne procured the bitter principle, which appears to be the active part of the root, by the following process: The root in coarse powder was treated with water in a percolator, until the infusion was no longer bitter; subacetate of lead was added to this, and the precipitate removed by filtration; carbonate of soda was then added to remove excess of lead, and the liquid again filtered. The pale yellow liquid was then allowed to filter through a column of purified animal charcoal. The liquid that passed through was totally devoid of taste and color. The coal was then washed with water until this commenced to have a bitter taste; it was then dried and treated with boiling alcohol, and the alcoholic solution allowed to evaporate spontaneously; it dried to a dark-green mass, no signs of crystallization being observed during the time. It was again dissolved in water, treated with ether, and allowed to evaporate, when a number of bitter, pale-green needle-shaped crystals were obtained.—*Am. Jour. Pharm. CXXV.*, 510.

Properties and Uses.—Leptandrin is a powerful cholagogue, with but slight laxative influence; except given in very large doses its cathartic powers are but very feeble. It is one of the most efficacious and important agents among those of American origin, being the only known medicine that efficiently stimulates and corrects the hepatic secretions, and functional derangements of the liver, without debilitating the system by copious alvine evacuations. It may be safely and efficaciously employed in the treatment of diarrhea, cholera-infantum, some forms of dyspepsia, typhoid fever, and all diseases connected with biliary derangements. Combined with podophyllin it is a prompt and effectual remedy in epidemic dysentery, often effecting a permanent cure in from twelve to eighteen hours; in dysentery with irritable bowels, it may be used alone with advantage, or combined with camphor, as in such cases its union with podophyllin is contra-indicated. In intermittents it renders the action of quinia, when united with it, more certain, and prevents the liability to a return of the disease, at least for the season, and is likewise highly beneficial in infantile remittent fever, and in periodic diseases generally, of an obstinate character, in which quinia alone seems to produce but little or no result.

It may also be used in many other combinations with much advantage, as with hydrastin, or dried beef's gall, in some dyspeptic affections, jaundice, piles, etc., or with iridin, baptisin, phytolaccin, corydallin, caulophyllin, and other active principles, in various forms of disease. Dose of Leptandrin, from one-half of a grain to five or six grains, every three or four hours, according to the action or effect desired. Some practitioners neglect the use of this agent, because it does not act so powerfully as podophyllin, and hence lose the influence of a very important remedy in functional derangements of the liver, and other organs essential to digestion. In relation to this article, Professor Hill observes:

"This is not strictly speaking a cathartic. It is aperient, alterative, and tonic. Its effects on the liver are peculiar. In cases of children afflicted with summer-complaint, where there is evidently a lack of the proper biliary secretion, but where, owing to the already irritated condition of the bowels, the ordinary medicines for arousing the liver are inadmissible, this article seems to be the very thing needed. While it acts freely upon the liver, instead of purging it seems only to change the discharges from the light and watery or slimy condition, to a darker and apparently bilious state, rendering them more and more consistent, until they become perfectly natural, without having been arrested entirely, or at any time aggravated. It at the same time seems to act as a tonic, restoring the tone of the stomach and increasing the strength and activity of digestion. It is a most valuable remedy in dyspepsia.

"The dose is from one-fourth to one grain every one or two hours in acute cases, and from one to two grains three times a day in chronic cases. It is valuable to combine with podophyllin as a remedy in dyspepsia and chronic hepatitis.

"In the epidemic dysentery, which has prevailed for the past two seasons, in many parts of our country, this article has been of great service. It was usually given with the best success after evacuating the bowels freely, with a combination of podophyllin and Leptandrin or rhubarb. For this purpose, give from one-half of a grain to one grain every hour, gradually lengthening the intervals as the discharges become darker. Though it may not be applicable in all cases of dysentery, it is doubtless one of the most useful articles in this dangerous disease."

In cholera-infantum, a disease which sometimes sets at defiance all the skill of the physician, I have met with excellent success by the following combination: Take of Leptandrin six grains, quinia three grains, camphor one grain and a half, ipecacuanha three-fourths of a grain. Mix and divide into twelve powders, of which one may be given every two or three hours, and its use continued thus for several days. Its action at first is to increase the alvine passages and apparently augment the disease, but in a few days the character of the evacuations changes, they become more and more normal, as well as more regular in their appearance; after which, one or two powders per day for a week, will render the cure permanent. This powder, in large doses for adults, will be found very efficacious in painful diarrhea and dysentery, as well as in severe pains depending upon intestinal irritation. The following has also been of advantage in cholera-infantum: Triturate together, charcoal one drachm, with Leptandrin three grains, and divide into twelve powders, of which one powder is to be given every two or three hours until the evacuations become more natural, after which, give one or two powders a day for a few days.

Leptandrin will be found to act with more certainty when it is given in a soluble form, as in tincture, weak solution of potassa, etc. Like hydrastin, and other concentrated preparations which are insoluble in water, it frequently passes through the alimentary canal unchanged, when given in the form of powder.

Off. Prep.—Pilulæ Baptisiæ Compositæ; Pilulæ Leptandrini Compositæ; Pulvis Leptandrini Compositus.

LEUCANTHEMUM VULGARE.

White Weed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES AND FLOWERS.

Description.—Leucanthemum Vulgare, the *Chrysanthemum Leucanthemum* of Linnæus, sometimes known as *Ox-eye Daisy*, is a perennial herb, with an erect, branching, furrowed *stem*, growing from one to two feet high; the *leaves* are comparatively few and small, alternate, amplexicaul, lanceolate, serrate, cut-pinnatifid at base; the lower ones petiolate, with deep and irregular teeth; the upper ones small and subulate, and those of the middle sessile, deeply cut at base, with remote teeth above. *Heads* large, terminal, solitary. *Disk* yellow. *Rays* numerous and white.—*W.*

History.—This plant was introduced into this country from Europe, and is a very troublesome weed to farmers, in nearly every section. It generally grows from one to two feet high, and bears white flowers in June and July. The leaves are odorous and somewhat acid; the flowers are bitterish; they impart their virtues to water.

Properties and Uses.—Tonic, diuretic, and antispasmodic. Large doses emetic. Used as a tonic instead of chamomile flowers, and has been found serviceable in hooping-cough, asthma, and nervous excitability. Very beneficial externally and internally in leucorrhea; and its internal use has been highly recommended in colliquative perspiration. Externally, it has been used as a local application to wounds, ulcers, scald-head, and some other cutaneous diseases. Dose of the decoction, from two to four ounces, two or three times a day. Said to destroy, or drive away fleas.

Off. Prep.—Decoctum Chrysanthemi.

LIATRIS SPICATA.

Button Snakeroot.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant, also known by the names of *Gay-feather*, *Devil's-bit*, etc., has a perennial, tuberous *root*, and an erect, annual *stem* from two to five feet in height, mostly stout and very leafy. The *leaves* are linear, glabrous, alternate, punctate, ciliate at base, the lower ones from three to five-nerved, and narrowed at base. The *flowers* are sessile, and of a bright purple color; the *heads* are many and densely crowded in a long, terminal spike, and from eight to twelve-flowered. *Scales of the* cylindrical bell-shaped *involucre* oblong or oval, appressed, with slight scarious margins. *Achenia* pubescent, obconic. *Pappus* permanent, colored, barbellate, not evidently plumose to the naked eye. *Receptacle* naked. This plant is found in moist places in the Middle and Southern States, and is found in abundance in the prairies.—*G.*—*W.*

LIATRIS SQUARROSA, or *Blazing Star*, has also a perennial tuberous *root*, with a *stem* two to three feet high, thickly beset with long-linear, nerved *leaves*, the lower ones being attenuated at the base. The *heads* are few, sessile or nearly so, with brilliant purple flowers; *racemes* flexuous, leafy; *involucre* ovate-cylindric; *scales of the involucre* large, numerous, squarrose-spreading, outer ones larger, leafy, inner ones mucronate-acuminate, scarcely colored. *Pappus* plumose. This plant is likewise found in the Middle and Southern States, growing in dry soil, and is known in the South by the name of *Rattlesnake's Master.*—*G.*—*W.*

LIATRIS SCARIOSA, or *Gay-feather*, has a perennial, tuberous *root*, with a stout, scabrous-pubescent *stem*, from four to five feet in height, and whitish above. The *leaves* are numerous, lanceolate, tapering at both ends, glabrous, with rough margins, entire, lower ones on long petioles, and from three to nine inches long, upper ones from one to three inches in length, by from one to three lines in width. *Heads* from five to twenty, an inch in diameter, in a long raceme, with from twenty to forty purple flowers. *Involucre* globose-hemispherical; *scales of the involucre* obovate or spathulate, very obtuse, with dry and scarious margins, often colored. *Pappus* scabrous. This plant is found in dry woods and sandy fields from New England to Wisconsin, and extending southward.—*G.*—*W.*

History.—All the above plants are splendid natives, and flower through August and September. There are several other species of this genus which appear to possess medical properties analogous to each other, and which deserve further investigation, as the *L. Odoratissima*, *L. Cylindracea*, *L. Graminifolia*, etc. The roots are the officinal parts; they are all tuberous, with fibers, and have a hot, somewhat bitter taste, with considerable acrimony, and an agreeable, turpentine odor. It appears to contain a resinous substance, and a bitter principle, but no analysis has been made; its virtues are extracted by alcohol, and partially by hot water, in infusion. The resin obtained from them might, probably, prove a valuable agent.

Properties and Uses—These plants are diuretic, with tonic, stimulant, and emmenagogue properties. A decoction of them is very efficacious in gonorrhea, gleet, and nephritic diseases, in doses of from two to four fluidounces, three or four times a day; it is also reputed beneficial in scrofula, dysmenorrhea, amenorrhea, after-pains, etc. It is likewise of advantage in sore-throat, used as a gargle, and in injection has proved useful in leucorrhea. Said to be beneficial in Bright's disease, in connection with Lycopus Virginicus and Aletris Farinosa; equal parts of each in decoction. These plants are celebrated for their alexipharmic powers in bites of venomous snakes; Pursh states, that when bitten, the inhabitants of the Southern States bruise the bulbous roots, and apply them to the wound, at the same time drinking freely of a decoction of them in milk. This requires corroboration.

Off. Prep.—Decoctum Liatris.

LIGUSTRUM VULGARE.

Privet.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES.

Description.—This plant, also called *Privy*, *Prim*, etc., is a smooth shrub, growing five or six feet high, with wand-like branches. The *leaves* are dark-green, one or two inches in length, and about half as wide, opposite, entire, smooth, lanceolate and obovate, obtuse or acute, and on short petioles. The *flowers* are small, numerous, white, and disposed in tetramerous, thyrsoid, terminal panicles. *Calyx* minutely four-toothed, deciduous, short-tubular; *corolla* funnel-form, tube short, limb with four spreading, ovate, obtuse lobes. *Stamens* two, on the tube of the corolla; *anthers* large, exserted. *Style* very short; *stigma* two-cleft. *Berries* spherical, black, in conical bunches, two-celled, and from two to four-seeded; *seeds* convex on one side, angular on the other.—*W.*—*G.*

History.—Privet is found growing wild in woods and thickets, and along the roadsides from New England to Virginia, and west to Missouri, flowering in May and June. It is used in England for hedges, from which place it is supposed to be introduced; but it is indigenous in Missouri. It is often cultivated in gardens. The leaves are the officinal parts; they have but little odor, and an agreeable bitterish and astringent taste; they yield their virtues to water or alcohol.

Properties and Uses.—Privet leaves are astringent; a decoction of them is very valuable in chronic bowel complaints, ulceration of stomach and bowels, as a gargle for ulcers of mouth and throat, and as an injection for ulcerated ears with offensive discharges, leucorrhea, gleet, and ulceration of the bladder, likewise in diabetes. They may be employed either in decoction or powder. Dose of the powdered leaves, from thirty to sixty grains, three times a day; of the decoction, from two to four fluidounces. The flowers have been employed for similar purposes with the leaves. The berries have a sweetish bitter taste, are reputed cathartic, and to render the urine brown; they have been used for dyeing. Probably the bark will be found equal, if not superior in efficacy, to the leaves. M. G. Potex found the bark to contain sugar, mannite, starch, muco-saccharine matter, bitter resin, bitter extractive, albumen, salts, chlorophylle, and a peculiar substance, which he called *ligustrin.*—*Am. Jour. Pharm.*, *XII.*, 347. It is deserving further attention.

Off. Prep.—Decoctum Ligustri.

LILIUM CANDIDUM.

Meadow Lily.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—This plant has a perennial root or bulb, composed of imbricated fleshy scales, from which arises a thick *stem* from three to four feet in height. The *leaves* are scattered lanceolate, and narrowed at the base. The *flowers* are large, snow-white, campanulate, smooth inside, and disposed in a terminal raceme.—*W.*

History.—This is an exotic, a native of Syria and Asia Minor, and is much cultivated in this country on account of its beautiful white flowers, which have long been regarded as the emblems of purity, and which appear in June and July. The bulb is the part used; it is inodorous, but has a mucilaginous, amarous, rather unpleasant taste. Mucilage enters largely into its constitution, together with a small quantity of an acrid substance, which disappears by heat. Water extracts its virtues.

Properties and Uses.—Meadow Lily, or *White Lily*, as it is sometimes called, is mucilaginous, demulcent, tonic, and astringent. Useful in leucorrhea and prolapsus uteri, the decoction taken internally, and employed in injection; it is more decided in its effects, when combined with life-root (*Senecio Gracilis*). Boiled in milk, it forms an excellent poultice for ulcers, external inflammations, tumors, etc. The recent root is stated to have been useful in dropsy. The flowers are very fragrant, which property they communicate to oily or fatty bodies, forming liniments or ointments useful to relieve the heat and pain attending local inflammations; the oil obtained from the petals is reputed efficacious in pains of the womb, and in otitis.

LINUM USITATISSIMUM.

Flaxseed.

Nat. Ord.—Linaceæ. *Sex. Syst.*—Pentandria Pentagynia.

THE SEEDS.

Description.—Flax is an annual plant, very smooth, with a slender fibrous *root*, and one or more straight, round, leafy, corymbose *stems*, a foot or two in height. The *leaves* are small, alternate, sessile, acute, three-veined, rather glaucous; the lowermost short and blunt. The *flowers* are several, large, blue, erect, disposed in a terminal corymbose panicle on long footstalks. The *calyx* is persistent, and consists of five ovate, acute sepals, which are three-veined at base and membranaceous on the margin. *Corolla* is composed of five thin, delicate, roundish, wedge-shaped, crenate petals, which are glossy, have numerous veins, and readily drop off. *Stamens* five, straight, awl-shaped. *Anthers* two-celled, arrow-shaped. *Ovary* ovate, superior; *styles* five; *stigmas* obtuse. *Fruit* a round capsule, five-celled, cells nearly divided by a false dissepiment; *seeds* two in each cell, ovate, compressed, brown, smooth, glossy.—*L.*—*W.*—*Torrey and Gray.*

History.—The native country of Flax is unknown, though supposed to be derived from Egypt, or from Central Asia. It has been known from remote antiquity, see Gen. xli., 42, and Exod. ix., 31. It is now naturalized in nearly all civilized countries. It blossoms from May to August, and matures its seeds early in autumn. The seeds, and their expressed oil are used in medicine; they are about the tenth of an inch long, egg-shaped, somewhat pointed at one end and blunted at the other, compressed, brownish, very smooth, shining, with a sharp margin, are odorless, internally yellowish-white, and have a taste like a mixture of oil and mucilage.—*P.*—*Ed.* They consist of a mucilaginous tegument and oleaginous cotyledons. When the teguments or husks are steeped in hot water, a mucilaginous, odorless, and almost tasteless substance is obtained, which, when alcohol is added, deposits white mucilaginous flocks. Diacetate of lead also forms a precipitate with it. This mucilage reddens litmus owing to its free acetic acid, is not colored blue by iodine, and is not affected by infusion of nut-galls, nor chlorine. It consists of a soluble part 52.70, an insoluble part 29.89, ashes containing silica, various saline matters, etc., 7.11, and water 10.30. The soluble part (*arabin*) when treated with nitric acid yields 14.25 per cent of mucic acid, and some oxalic acid. The insoluble part is a nitrogenized substance, not yielding mucic acid when treated with nitric acid. In preparing an infusion the seeds should not be bruised as the mucilage resides only in their external coat. L. Meyer, found linseed to contain fat oil (in the nucleus) 11.265; wax (in the husk principally) 2.488; resinous coloring matter 0.550; yellow extractive with tannic acid and salts 1.917; sweet extractive with malic acid and some salts 10.884; gum (in the nucleus) 6.154; nitrogenous mucilage, with acetic acid and salts (in the husk principally) 15.120; starch with salts (in the husk) 1.480; albumen (in the nucleus) 2.782; gluten (in the nucleus) 2.932; husk and emulsion (?) 44.382. The ashes contained oxide of copper.—*P.*

The internal portion of the seed, or nucleus, contains a peculiar oil, called *Linseed Oil*, and which is obtained from the seeds by expression without the aid of heat. It is rather thick, of a pale amber color, inclining to green, of a feeble, peculiar, disagreeable odor, and a nauseous taste. Its density varies from 0.927 to 0.934. It resists a cold of 4° F., without concreting; on exposure to the action of the air, it slowly becomes thicker, and gradually hardens into a firm elastic varnish—on which account it is very much used among painters, in making printers' ink, and for other important applications. It boils at 600° F., is soluble in forty parts of cold alcohol, five of boiling, and in one part and a half of ether; becomes rancid with facility; and is saponified by the alkalies. Prepared on the large scale, the gummy substance in the tegument of the seeds is destroyed by roasting them previous to expression. *Oil-cake* is the compressed refuse portion, remaining after the oil has been pressed out; it contains the mucilage of the husk, and is used to feed cattle. The seeds finely ground, furnish a dark ash-colored powder, *flaxseed meal*, which forms with hot water a tenacious substance, used for luting in chemical operations. For poultices, the officinal *Farina Lini* or *Linseed meal* is the best, as the oil having been previously removed by expression, the preparation is not so apt to become rancid and irritate the skin.

Properties and Uses.—Flaxseed is used as a demulcent and emollient. An infusion of the entire seeds, an ounce to a quart of water at 212° F., forms a mucilaginous draught which is much employed in ardor urinæ and urinary diseases, nephritic pains, cough, colds, colo-rectitis, pulmonary, gastro-enteric, and urinary inflammations. When not contra-indicated, the addition of lemon-juice improves the flavor, or, it may be sweetened with loaf-sugar or honey. An infusion of flaxseed, or of flaxseed meal forms an excellent laxative injection; and the meal added to boiling water, and made of the proper consistence makes an excellent cataplasm. Dose of the infusion, one or two pints daily. Linseed oil in doses of two fluidounces twice a day, is said to have cured severe cases of piles within two or three weeks; while using it, liquors and stimulating diet are to be avoided. It is likewise reputed beneficial when internally administered in dysentery, colic, and lumbricus. Used as an enema it is advantageous in dysentery, hemorrhoids and ascarides; and combined with lime-water, it forms the Carron Oil, an excellent application to burns. One pint of linseed oil, combined with half an ounce each of oils of origanum and wintergreen, forms a pleasant cathartic; to be given in the same doses as castor-oil. The oil contains a considerable amount of oleic acid, together with margaric acid and glycerine.

Off. Prep.—Cataplasma Lini; Linimentum Calcis.

LIQUIDAMBAR STYRACIFLUA.

Sweet Gum.

Nat. Ord.—Altingiaceæ, *Lindley.* Balsamaceæ. *Sex. Syst.*—Monœcia Polyandria.

THE CONCRETE JUICE.

Description.—The Sweet Gum tree attains the height of from fifty to sixty feet, with a diameter of from three to five feet. It is covered with a gray, deeply furrowed bark, with corky ridges on the branchlets. The *leaves* are palmate, deeply five to seven-lobed, rounded, smooth and shining, of a rich green color; the *lobes* finely glandular, serrate and acuminate; the *veins* villous at their bases. When bruised the leaves are fragrant, and turn crimson or deep-red in autumn. *Sterile flowers* in several globular heads arranged in a conical cluster, naked or achlamydeous; *aments* monœcious, roundish, surrounded with a four-leaved involucre; *stamens* numerous, intermixed with minute scales; *filaments* short; *anthers* numerous, oblong, subsessile. *Fertile flowers* consist of two-celled ovaries, subtended by minute scales, all more or less cohering and hardening in fruit, forming a spherical catkin or head; *catkins* racemed, nodding, inclosed in the bud by a four-leaved deciduous involucre. *Styles* two, long. *Fruit* a kind of strobile, composed of the indurated scales and capsules. *Capsules* or pods two-beaked, two-celled, opening between the two awl-shaped or prickly diverging styles. *Seeds* small, several, amphitropous, with sparing albumen and a straight embryo; *cotyledons* foliaceous.—*G.*—*W.*

History.—This is a large and beautiful tree, with fine-grained wood, growing throughout the United States in moist woods from Connecticut and New Jersey, southward; but found in greater abundance in the Southern and Middle States. In warm climates, a whitish-yellow, somewhat limpid juice exudes from incisions made into the tree, especially during the warm seasons; it has the density of thick syrup, but by standing it forms a soft, resinous-like, adhesive mass, somewhat like white turpentine, but opaque and almost black. It is known as *Sweet Gum*, or *Liquidambar* (Liquidum Liquidambar Styracifluæ); it has a pleasant, benzoinic odor, and a benzoinic, somewhat bitter and pungent taste. It is soluble in alcohol, ether, oils, lard or fats, softens in warm weather, and becomes harder in cold. Its tincture slightly reddens litmus paper. Bonastre found it to contain volatile oil 7.00, semiconcrete matter 11.1, benzoic acid 1.0; crystalline matter soluble in water and alcohol 5.3, yellow coloring matter 2.05, oleo-resin 49.0, styracin 24.0. The volatile oil may be obtained by distilling the balsam with water; it is liquid and transparent, and colorless like water, is lighter than water, heavier than alcohol, has a strong, Sweet Gum odor, and an acrid and burning taste, leaving a very disagreeable impression in the mouth. It is composed of a transparent oil, having a strong aromatic odor and taste, and a whitish solid matter, inodorous, and of the consistence of wax. The volatile oil congeals at 32° F., and, according to Henry, consists of $C_{10} H_7$. The benzoic acid is increased in quantity by age. Styracin consists of quadrangular pyramidal crystals insoluble in water, soluble in boiling alcohol, but deposited on cooling, tasteless, and of a vanilla-like odor. Their formula is $C_{11} H_5 O_2$. Mr. D. Hanbury states that this balsam does not contain benzoic but cinnamic acid, and he is undoubtedly correct. He gives as a method of detecting these acids the following: Heat the acid in a test tube or small flask, with solution of chloride of lime; cinnamic acid will evolve an odor similar to the essential oil of bitter almonds, while benzoic does not.—*Am. Jour. Pharm., Sept.*, 1857, *3rd series, XXIX.*, 478.

Properties and Uses.—It probably possesses virtues similar to the concrete juice of *Styrax officinale*, which see. It makes an elegant and agreeable ointment when melted with equal parts of lard or tallow, which I have found decidedly useful in hemorrhoids, psora, ringworm of the scalp, *porrigo scutulata*, and many other cutaneous affections; also in that indolent species of ulcer, known as "fever-sores on the legs." In anal fistula, it maintains an increased discharge, softens the callosity of the walls of the sinus, and produces a normal result, and effects this without pain to the patient. If necessary, in fistula, a little creosote, or other stimulant may be added to it. This employment of Sweet Gum is not generally known, and physicians would do well to avail themselves of its use in the above diseases. It is also used in chronic catarrh, coughs, and pulmonary affections. The dose internally is from ten to twenty grains.

LIRIODENDRON TULIPIFERA.

Tulip Tree.

Nat. Ord.—Magnoliaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE BARK.

Description.—This tree is also known by the names of *Poplar*, *White Poplar*, *Yellow Poplar* and *White-wood.* It is ordinarily about eighty feet high, with a diameter of two or three feet, but in favorable situations it frequently attains a height of one hundred and forty feet, with a diameter of eight or nine feet. The *trunk* is perfectly straight and cylindric, and is covered with a bark of a brown or grayish-brown color, smooth when young, but rough and furrowed when old. At the top it divides rather abruptly into coarse, crooked branches, in somewhat regular order, giving a symmetrical aspect to the tree; the bark of the young branches is bluish or of a reddish tinge. The *leaves* are large, bright green, alternate, on long petioles, smooth, shining, three-lobed, the lateral lobes ovate, the middle one truncated, appearing as if cut off by a broad, shallow notch. The lateral lobes of the large leaves are furnished with a tooth or additional lobe on their outside. There is a variety with the lobes of its leaves not pointed, but very obtuse. The *flowers* are large, solitary, terminal, tulip-shaped, yellowish, from four to six inches in diameter. *Bracts* two, triangular, falling off as the flower expands. The *calyx* is double, the inner and proper sepals being three, large, oval, concave, veined, of a pale-green color, spreading at first, but afterward reflexed. The *corolla* consists of six, seven, or more petals, which are obtuse, concave, veined, of a pale yellowish-green color, and marked with an irregular indented crescent of a bright orange on both sides toward the base. *Stamens* numerous, with short filaments, and long, linear, adnate anthers. The *pistil* is a large, conical, acute body, its upper half covered with minute, blackish, recurved stigmas; its lower furrowed, being a mass of coalescing styles and ovaries. The *fruit* is a cone of imbricated seed-vessels, which are woody and solid, their upper portion formed by the long lanceolate style; *seeds* two, blackish, ovate, one or both often abortive.—*L.*—*B.*—*W.*

History.—This is one of the most magnificent and remarkable trees of the American forests, on account of its size, its elegant appearance when in flower, its therapeutical virtues, and its serviceable wood. It is found in rich soils from Maine to the Gulf of Mexico, and reaches its greatest size in the middle and South-Western States; its flowers appear in May and June. The wood is compact and light, and is extensively used as a substitute for pine. It is but slightly affected by dampness in the air, and is seldom injured by worms. The part used in medicine is the bark both of the trunk and root. It is whitish, with a yellow tinge when its epidermis is removed, light, fibrous, easily broken, of an unpleasant, somewhat aromatic odor, and an aromatic, pungent, slightly camphorous and amarous taste. The root-bark is colored the darkest. The virtues of this bark are impaired by time. Water or alcohol take up its active properties, which are dissipated by a continued heat at 212° F. The bark should be collected during the winter. Prof. J. P. Emmett discovered in the bark a peculiar principle which he named *liriodendrin*, and which he considered intermediate between camphor and the resins. The easiest mode of obtaining it is to digest the fresh bark for five or six hours in alcohol, heated to 100°, in an opaque vessel, as light exerts an influence upon it. A bitter solution is obtained, which must be filtered, reduced by distillation to one-fifth its bulk, and on cooling impure liriodendrin is deposited. Toward the end of the process, the bitter principle separates in drops of an amber color, which becomes solid on cooling. The liquid is then evaporated to the consistence of honey, and a few drops of ammonia being added, the liriodendrin is precipitated. It must now be washed in a solution of caustic potassa, till water ceases to be colored by it. In this state it contains water, and is softened by the heat of the hand. To obtain it in crystals dissolve it in alcohol, heat the solution to 100°, add slowly water of the same temperature, till the liquid becomes of a milk white color, then filter and set it aside for the crystals to be deposited. They are in colorless scales or in needles, insoluble in cold water, soluble in alcohol, ether or nitric acid, neutral, fusible at 180°, sublime at a higher heat and partially decompose, and have an aromatic, bitter, somewhat acrid taste. Chlorine converts them into a bitter resin; iodine colors the most minute quantity of them yellow; and when triturated with mucilage of gum Arabic, the bitter taste disappears, and when the solution is left at rest, crystals are deposited different from those of liriodendrin.—*T.*

Properties and Uses.—Tulip-tree bark is an aromatic, stimulant tonic, and has proved beneficial in intermittents, chronic rheumatism, chronic gastric and intestinal diseases, worms, and hysteria. In hysteria, combined with a small quantity of laudanum, is is said to be speedy, certain, and effectual, and also to abate the hectic fever, night-sweats, and colliquative diarrhea of phthisis. The warm infusion is diaphoretic, and under certain states of the system has proved diuretic. Dose of the powdered bark, from a scruple to two drachms; of the saturated tincture, which is the best form of administration, one fluidrachm; of the infusion, from one to two fluidounces; of liriodendrin, from five to ten grains.

Off. Prep.—Decoctum Liriodendroni; Vinum Hydrastii Compositum.

LOBELIA INFLATA.

Lobelia.

Nat. Ord.—Lobeliaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND SEEDS.

Description.—This plant, generally known as *Wild*, or *Indian Tobacco*, is an annual or biennial indigenous plant, more commonly the latter, with a fibrous, yellowish-white *root*, and an erect, angular, very hairy stem, in the full-sized plant much branched, and from six inches to three feet in height. The *leaves* are alternate, scattered, sessile, ovate-lanceolate, serrate, veiny, hairy. The *flowers* are small, numerous, pale-blue, on short peduncles, each originating from the axil of a small leaf. The *calyx* consists of five, subulate segments. The *corolla* is tubular, small, slit on the upper side, and ventricose at the base; the limb bilabiate; tube prismatic; segments spreading and acute; two upper ones lanceolate, three lower ones oval. *Anthers* united into an oblong, curved body, purple; *filaments* white. *Style* filiform; *stigma* curved, two-lobed, and inclosed by the anthers. *Capsule* two-celled, ovoid, inflated, striated, ten-angled, and crowned with the persistent calyx. *Seeds* numerous, small, oblong, brown. *L.—B.—W.*

History.—This plant grows in nearly all parts of the United States, in fields, meadows, woods, etc., flowering from July to November. The whole plant is active, but the leaves and seeds are more usually employed. The root is supposed to be more energetic, medicinally, than any other part of the plant. The proper time for gathering the plant is from the last of July to the middle of October, during which period the seed-vessels are in great abundance. The plant should be dried in the shade, and then be preserved in packages, or covered vessels, more especially if it be reduced to powder. When dried, it has a faint, nauseous, rather disagreeable odor, and a strong, acrid, nauseous taste developed by chewing, somewhat similar to that of tobacco, which powerfully affects the throat and fauces, occasioning ptyalism and sickness at stomach. The leaves form a greenish powder; the seeds a brownish. Hot water, vinegar, ether, or alcohol take up its medicinal principles; but boiling dissipates them. Lobelia seed viewed under the microscope are about $\frac{1}{33}$ of an inch in length, $\frac{1}{85}$ of an inch in breadth, of a dark-brown color, oblong, oval, or almond-shaped, reticulated with irregular, oblong-square, or rectangular ridges and furrows, somewhat resembling basket-work; the only seed which resemble them are those of the *L. Cardinalis*, but which are not so dark-colored, have reticulations not so well defined, and are of larger size. —*P.*—*F. Curtis.*

Pereira found the plant to contain a volatile principle, Lobelina, Lobelic acid, resin, chlorophylle, gum, extractive, caoutchouc (?), and woody fiber. Prof. W. Procter, jr., found in it Lobelina, resin, chlorophylle, gum, Lobelic acid, fixed oil, salts of lime and potassa, oxide of iron, and woody fiber.

The *fixed oil* of Lobelia may be obtained by bruising the seed between heated rollers, and pressing while hot in a strong linen cloth, between proper iron plates. Its consistence is nearly like that of linseed oil, and possesses the drying qualities common to the fixed oils. It possesses all the medicinal properties of the seed.

Lobelina was first obtained by Prof. Procter; the seeds contain double the amount found in any other part of the plant. Prof. Procter procured it by the following process: twelve ounces of finely powdered Lobelia seed were macerated in twenty-four fluidounces of alcohol, sp. gr., 880, acidulated with half a fluidounce of acetic acid; on the fourth day this solution was subjected to displacement. This process was continued with diluted alcohol until the seeds were exhausted of their acrimony. The tincture obtained, equal to five pints, was then evaporated to the consistence of an extract which weighed an ounce and a half, or one-eighth of the seeds employed. This extract was triturated with an excess of magnesia, and then twelve fluidounces of water gradually added. After frequent agitation for several hours, the liquid was filtered, and the filter washed with water. This solution was then agitated with six fluidounces of ether, until all its acrimony was removed. The ethereal solution was then decanted and allowed to evaporate spontaneously in a porcelain capsule, which left 18.5 grains of a reddish-brown lobelina, having a honey-like consistence. To remove the color, the impure lobelina was dissolved in water, then slightly acidulated with diluted sulphuric acid, mixed with purified animal charcoal, boiled, saturated with magnesia, and filtered. This solution was agitated with ether until the lobelina was removed; the ethereal solution was then separated and allowed to evaporate. Thus obtained, lobelina has a light-yellow color, a somewhat aromatic odor, is lighter than water, soluble in water, but more so in alcohol or ether. It is precipitated as a white bitannate by tannic acid; nitrate of silver occasions a white precipitate, becoming dark-brown upon standing; acetate of lead gives a white precipitate, and persulphate of iron causes a gradual brown precipitate. Gallic acid, and corrosive sublimate do not affect it. Concentrated nitric or hydrochloric acids, merely dissolve it without producing any change; sulphuric acid blackens it, then dissolves it, and removes its acrid taste. It forms salts with acids more soluble in water than the alkaloid itself, soluble in alcohol, but less so in ether. One-fourth of a grain given to a cat produced violent emesis, and much prostration, to recover from which required three hours.—*Amer. Jour. Pharm.* 1842, *XIII.*, 1. Unless united with acids, it is decomposed by boiling. It possesses the active properties of the plant in a concentrated form. As an emetic, three to ten drops, sufficiently diluted with water, will generally operate. With vinegar, or citric acid and honey, it forms an oxymel which is very beneficial in bronchitis and cynanche trachealis. The caustic alkalies decompose lobelina. This principle may also be obtained by the method named for procuring *Hyoscyamia*, which see.

Lobelia was known to the Penobscot Indians, and was also extensively used by the people of New England in domestic practice, long before the time of Samuel Thomson, its assumed discoverer.

Properties and Uses.—Lobelia is emetic, nauseant, expectorant, relaxant, sedative, antispasmodic, and secondarily cathartic, diaphoretic, and astringent. There is much discordance of opinion among medical men as regards its narcotic properties, many denying that it holds any such influences whatever. When chewed, Lobelia produces a disagreeable sense of burning and distension, which extends into the esophagus, terminating in nausea and vomiting, with oppressive prostration, relaxation of the muscular system, and a languid pulse. In doses of ten or twenty grains of the leaves or seeds, it is a prompt and efficient emetic, and may be given in all cases where emesis is indicated; its action is somewhat modified by a combination with ipecacuanha and other vegetable emetics, and rendered safer and more effectual. In very small doses it excites diaphoresis, increases expectoration, diminishes cough, and counteracts spasmodic action. In all diseases of the respiratory organs, as croup, pneumonia, pertussis, catarrh, asthma, and those fits of dyspnœa resembling asthma, it will be found useful either as an emetic or expectorant. As with ipecacuanha so with Lobelia, it will be found very useful in all febrile diseases, especially during their earlier stages, as it relaxes the system, modifies arterial excitement, and produces diaphoresis, thus tending to equilibriate the circulation, and assisting the vital powers to eliminate morbid humors. As an expectorant it may be used in tincture combined with tincture of bloodroot, syrup of senega, oxymel of squill, wine of ipecacuanha, etc. In all cases where relaxation of the system is desired, either to subdue spasm, or otherwise, Lobelia will be found a very valuable article—probably no remedy is more effectual. Spasmodic movement is incompatible with nervous and muscular relaxation, hence we find prompt relief in epilepsy, hysteria, cramps, tetanus, chorea, convulsions, etc., by the exhibition of Lobelia in doses sufficient to excite nausea and relaxation. Rigidity of the os uteri has often been overcome by the employment of this drug internally, or as an enema. In strangulated hernia, and other intestinal obstructions, it has been found an excellent relaxant when used in injection; and on this account it is highly beneficial in fractures, dislocations, and tedious labors. It may be given internally, and applied in fomentation externally; the oil may be used externally likewise for the purpose of causing relaxation.

Externally, the infusion has been found useful in ophthalmic affections; and the tincture is a valuable local application to sprains, bruises, rheumatic pains, erysipelas, and erysipelatous inflammations, tetter, and other forms of cutaneous disease, as well as a remedy for the poison from ivy or dogwood. A poultice of powdered Lobelia and slippery-elm bark, with a weak ley-water will be found valuable in erysipelatous diseases, bites and stings of poisonous insects, spasmodic affections of the limbs, pains, and to produce muscular relaxation.

The oil of Lobelia, as prepared by W. S. Merrell, is valuable in tetanus and some other extreme cases, as it is easy to introduce enough upon the tongue to relax the whole system immediately. On account of its tendency to produce inflammation of the stomach, it should not be employed alone as a common emetic, but a few drops of it should be triturated with sugar, and diffused in chamomile, boneset, or other emetic infusion. One drop of the oil triturated with one scruple of sugar, and divided into from six to twelve doses, will be found highly useful as an expectorant, nauseant, sedative, and diaphoretic, when given every one or two hours, as may be required. As a local application, much benefit may be derived from it, where a particular nerve is to be quieted, or a muscle to be relaxed. An excellent liniment may be made of a mixture of half an ounce each of oils of amber and sassafras, a drachm of oil of Lobelia, and a half a drachm of ethereal oil of capsicum. To be used in painful neuralgic and rheumatic affections. As an emetic, dose of the powder, from twenty to sixty grains; of the tincture, from two to four fluidrachms. As a nauseant and expectorant, from five to twenty grains. When Lobelia does not act as an emetic, it is very apt to purge.

There are two other species of Lobelia, the Blue Lobelia, *Lobelia Syphilitica*, and the Red Lobelia, *L. Cardinalis*. The first is diaphoretic, emetic and cathartic; also diuretic and antisyphilitic, and a strong infusion of it has cured gonorrhea. It has likewise been used in dropsy, diarrhea, and dysentery. The root is the part used; dose, from twenty to sixty grains of the powder. The *L. Cardinalis* is said to be anthelmintic, nervine, and antispasmodic. These two varieties are seldom, if ever, used in medicine.

Off. Prep.—Acetum Lobeliæ; Cataplasma Lobeliæ et Ulmus; Enema Lobeliæ Composita; Extractum Lobeliæ Fluidum; Extractum Lobeliæ Fluidum Compositum; Linimentum Stillingiæ Compositum; Lotio Lobeliæ Composita; Oleum Lobeliæ; Pilulæ Aloes Compositæ; Pulvis Lobeliæ Compositus; Tinctura Hydrastis Compositæ; Tinctura Lobeliæ; Tinctura Lobeliæ Composita; Tinctura Lobeliæ et Capsici; Tinctura Sanguinariæ Acetata; Tinctura Sanguinariæ Composita; Tinctura Viburni Composita.

LYCOPUS VIRGINICUS.

Bugleweed.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE HERB.

Description.—This plant, also known as *Paul's Betony*, and *Water Horehound*, is an indigenous, perennial herb, with a fibrous root, and a smooth, straight, obtusely four-angled *stem*, with the sides concave, producing slender runners from the base, and from ten to twenty inches in height. The *leaves* are opposite, oblong, or ovate-lanceolate, toothed, entire toward the base, with glandular dots underneath. The *flowers* are very small, purplish, in dense, axillary whorls; at the base of each flower are two, small, subulate bracts. *Corolla* campanulate, four-cleft, the tube as long as the calyx, upper segment broadest, emarginate. *Calyx* tubular, four-cleft, longer than the achenia. *Stamens* two, distant, diverging, simple; *anthers* erect, bilobed; *ovary* superior, four-angled; style straight, slender; *stigma* bilobate; *achenia* four, smooth, obovate, obliquely truncate at apex, compressed, margins thickened.—*G.*—*W.*—*R.*

History.—Bugleweed is found growing in almost all parts of the United States, in moist and shady situations, flowering in July and August. It has a peculiar, balsamic, terebinthinate odor, and a disagreeable, slightly bitter taste. It imparts its properties to boiling water in infusion. The whole herb is officinal. It has not been analyzed, but, probably, its virtues depend upon a volatile oil and tannic acid.

Properties and Uses.—The exact medicinal virtues of this plant are not well determined. It appears to possess sedative, tonic, astringent, and narcotic properties, and has been successfully used in incipient phthisis, hemoptysis, and other hemorrhages; it soothes irritation, reduces the frequency of the pulse, and lessens cough. It acts somewhat like digitalis, in reducing the velocity of the pulse, but is devoid of the dangerous effects resulting from the use of that drug. It is decidedly beneficial in the treatment of diabetes, having cured when all other means were useless; and has been of service in chronic diarrhea and dysentery, inflammatory diseases of drunkards, diseases of the heart, and intermittents. Dose of the powder, from one to two drachms; of the infusion, from two to four fluidounces.

The *Lycopus Europæus*, a European plant introduced into this country, is said to possess febrifuge properties, curing severe intermittents in doses of one or two drachms of the powdered plant, every two or four hours. It has been confounded with the *L. Virginicus*, but may be discriminated by its stem being more *acutely* four-angled, its leaves not so broad, the lower being somewhat feather-cleft, its flowers more closely grouped, and the calyx divisions presenting short spines.

Off. Prep.—Infusum Lycopus.

LYTHRUM SALICARIA.

Loosestrife.

Nat. Ord.—Lythraceæ. *Sex. Syst.*—Dodecandria Monogynia.

THE HERB.

Description.—This plant, also known by the name of *Purple-willow-herb*, is a handsome perennial, with a woody root, branching at the crown, and from which arises several erect, acutely quadrangular, either smooth or downy, leafy, generally simple, reddish *stems* from two to five feet high. The *leaves* are nearly sessile, lanceolate, acute, entire, from three to six inches long and about one-fourth as wide, the upper ones diminished to sessile bracteas, all mostly opposite, sometimes in whorls of three or four, in which cases the number of angles on the stem is likewise increased. The *flowers* are large, numerous, and showy, nearly sessile, in numerous axillary whorls, six in each, of a variable crimson or purple, composing long leafy spikes. The *calyx* is inferior, cylindrical, striated, limb with six broad teeth, and the same number of alternate, smaller, subulate, diverging ones; six of the teeth long and reddish. *Corolla* of six, equal petals. *Stamens* twelve; *anthers* conspicuous, red, with green or yellow pollen. *Capsule* small, elliptical, two-celled, many seeded.—*L.*—*W.*

History.—This plant grows in several parts of the globe, and is found in wet meadows, ditches, etc., in this country, especially in the Northern and Eastern States, bearing purple flowers in July and August. It has no odor, but an herb-like, astringent taste, and by chewing becomes very mucilaginous. The ferruginous salts darken its infusion, and boiling water takes from it a large amount of mucilage, becoming quite viscid. It yields its properties to water. It has not been analyzed, but probably contains tannin and much mucilage.

Properties and Uses.—Loosestrife possesses considerable mucilage, rendering it a demulcent, while at the same time its tannic acid gives to it astringent properties. A decoction of it used freely has been serviceable in various affections of the bowels where this class of remedies was indicated, as in colo-rectitis, summer-complaint of children, diarrhea, etc. Externally, it is very beneficial as a local application in chronic ophthalmia, ulcers, and some forms of cutaneous disease; also in leucorrhea, gleet, chronic gonorrhea, etc., being used either as a wash, or in form of poultice. Dose of the decoction, one, two, or three fluidounces; of the powder, thirty to sixty grains, repeated every three or four hours. The *Decodon*, or *L. Verticillatum*, or Swamp Willow-herb, bearing purple flowers, possesses similar properties to the above; it is said to cause abortion in mares and cows browsing it in winter, and may, perhaps, exert a medicinal influence on the female uterus. It grows in swamps throughout the United States and Canada, has a *stem* woody at the base, often prostrate, and rooting at the summit, three to eight feet long, or when erect from two to three feet in height, and from four to six angled. The *leaves* are opposite, or in whorls of three, lanceolate, on short petioles, acute at base, from three to five inches long, gradually acuminate and acute at apex. The *flowers* are large, purple, in axillary subsessile umbels of three or more, apparently whorled, constituting a long, leafy, terminal and showy panicle. *Calyx* short, broadly campanulate, with five erect teeth, and five elongated, spreading, horn-like processes. *Petals* five or six. *Stamens* ten, alternate ones very long; *style* filiform; *capsule* globose, included, three-celled, many seeded.—*W.*—*G.*

Off. Prep.—Decoctum Lythri.

MAGNESIA. (*Magnesia Usta.*)

Magnesia.

Preparation.—Magnesia, or *Calcined Magnesia*, as it is more usually termed, is obtained by placing a convenient quantity of commercial carbonate of Magnesia, in small lumps (not finely powdered), in an earthen crucible, which may be nearly filled, and the latter, covered, is placed in a good wind furnace. So soon as the crucible is red-hot, its contents are from time to time carefully stirred with a clean iron spatula; and when the interior portion has also acquired this temperature, a small quantity is withdrawn, and when cool, shaken with sulphuric or hydrochloric acid. If this causes an evolution of gas, the heat must be continued until a small portion, dropped into a glass of dilute acid, quietly sinks to the bottom, and after a few minutes dissolves without the slightest evolution of gas. The contents of the crucible are now emptied on a clean iron or copper plate, and before they are quite cool placed in a well-stoppered bottle; the crucible, in the meantime, is filled with a fresh portion, and the heating proceeded with. Nine parts of carbonate of Magnesia yield about four parts of calcined.

History.—The commercial carbonate of Magnesia is a basic salt, consisting of four equivalents of Magnesia, three equivalents of carbonic acid, and four of water, which may be considered a combination of three equivalents of neutral hydrated carbonate of Magnesia, and one equivalent of hydrate of Magnesia. When heated to redness, the carbonic acid and water are given off, and the pure Magnesia remains; 2,307 parts carbonate of Magnesia yield 1,032 parts of calcined. The water and carbonic acid are given off most readily when the preparation is in moderate size lumps. In testing for carbonic acid, the dilute acid must not be added until the Magnesia is nearly cool, otherwise a hissing is caused, which may readily be mistaken for an effervescence. The Magnesia should also be added to the acid, the latter in considerable excess, and not *vice versa*, as in the last case the carbonic acid is likely to enter into combination with a portion of the Magnesia as a bicarbonate, and thus escape the eyes of the manipulator. If the Magnesia is heated after the carbonic acid and water are evolved, it soon loses its lightness, and acquires a compact, lumpy form. By carefully observing these apparently trifling rules, a beautiful preparation will be obtained.— *Witt.*

Magnesia is a snow-white, impalpable, and odorless powder, of various degrees of density, of a somewhat earthy and obscurely alkaline taste, and undergoing no change at the ordinary red heat. Exposed to the air it absorbs from twelve to twenty per cent. of moisture, and a small proportion of carbonic acid, becoming partially converted into basic carbonate of Magnesia. It exerts a slight alkaline action on vegetable colors when these are moistened. It crackles slightly when thrown into water. Unlike lime, it evolves scarcely any heat when water is added to it, although when in small quantity this fluid is absorbed by it. Water, in large quantity, dissolves traces of it; on heating the aqueous solution it becomes turbid, but clears again on cooling. Dr. Fyffe states, that it requires 5,142 parts of cold, and 36.000 parts of hot water to dissolve it. Its specific gravity is variously given as 2.3, 3.07, and 3.2. When subject to continued trituration, its density is much augmented, so that a bottle which would only contain one ounce of it when not triturated, will, by this process, readily hold four ounces. It is dissolved by the dilute acids without effervescence; if gas-bubbles are given off, *carbonic acid* is present. If dilute sulphuric acid leaves a residue insoluble in water, but dissolving when heated with a solution of caustic potassa, the Magnesia contains *silica;* if soluble in a large quantity of water it is sulphate of lime, and the Magnesia contained *lime.* If silica and lime are present, the latter is most readily detached by the addition of oxalate of ammonia to the neutral solution of the sulphate. Bicarbonate of potassa also gives a precipitate of carbonate of lime, when lime is present. If the Magnesia be dissolved in sulphuric or muriatic acid, and the addition of ammonia causes a precipitate not dissolved by sal-ammoniac, *alumina* is present; the Magnesia will be partially precipitated, but is again taken up by sal-ammoniac (ammonia is evolved, and a readily soluble double salt results). If *iron* be present, the addition of tannic acid will occasion a violet, or bluish-black turbidness in the neutral solution in sulphuric acid. If pure water, agitated with the preparation, subsequently gives a turbidness with nitrate of baryta, or silver, *sulphuric* or *hydrochloric acid* is present, arising from the sulphates and chlorides not having been well washed from the carbonate of Magnesia.—*Witt.*

Magnesia is an oxide of magnesium, consisting of magnesium 12, oxygen 8, = 20; its formula being Mg O. The best Magnesia is Henry's; the next Husband's; and the third Ellis's.

In the form of light Magnesia, or still better, the gelatinous hydrate, separated from the solution of sulphate of Magnesia by caustic potassa, and dried, Magnesia has been recommended as an antidote to arsenic, by Bussy; and my experiments, like his, show that arsenic is as thoroughly removed from a solution as by hydrated sesquioxide of iron. For solidifying copaiba it answers best when perfectly anhydrous. (*Mialhe.*)—*C.*

As some ignorant and unprincipled, self-styled chemists, and medical teachers, have attempted gross impositions upon the profession by presenting them with sugar of milk, Magnesia, etc., colored and flavored to represent the concentrated preparations, I will explain the mode of detecting these under their proper heads—and would enjoin upon all high-minded and honorable physicians the necessity for closely watching all this class of agents when derived from suspicious sources, as it will probably be the case that as fast as one imposition is detected, another will be perpetrated. Place a small quantity of the suspected article on a piece of platinum foil, or on a platinum spatula, and direct the flame of an alcohol lamp upon it, continuing this until the article is consumed, or until an incombustible white substance is left. Place a small quantity of this substance on a glass slide, and add a drop of hydrochloric acid to it; then add a drop or two of a solution of phosphate of soda, and of aqua ammonia, and place a thin glass over the mixture. Upon immediately examining this under the microscope, if the residue first obtained by calcination be Magnesia, arborescent crystals of the double phosphate of ammonia and Magnesia, formed by the double decomposition which has occurred among the substances, will be seen. *See Sugar of Milk, and Soda, for other modes.*

Properties and Uses.—Magnesia is antacid, antilithic, and laxative. It is useful in dyspepsia with acidity, and is preferable to the carbonate as it does not give rise to flatus, and the dose is less; its laxative qualities likewise give it some advantage over alkaline remedies. In all cases attended with acidity and constipation it will be found useful. It acts as an antilithic, first by correcting gastric acidity, and secondly by forming with free lithic acid, or lithate of ammonia, the more soluble lithate of magnesia. It is on this account beneficial in gout, and rheumatic gout, frequently giving material relief. When no acid is present in the stomach or intestines, magnesia is liable to lodge in some part of them, hence, in such instances, its administration should be followed by a draught or two of lemonade. From five to ten grains of rhubarb mixed with twenty or forty grains of Magnesia, and a few grains of ginger, form an excellent laxative and antacid.

The following is recommended in cases of poisoning, in which the nature of the poison is unknown: After freely evacuating the stomach by emetics, give the following mixture in a sufficient quantity of water—Calcined Magnesia, pulverized charcoal, and sesquioxide of iron, of each equal parts, mixed together. It is perfectly innocuous, and as its ingredients are antidotes to the most active and commonest poisons, it is very likely to be efficacious. Dose, as a laxative, from half a drachm to a drachm; as an antacid, or antilithic, from ten to thirty grains twice a day.

MAGNESIÆ CARBONAS.*

Carbonate of Magnesia.

Preparation.—Carbonate of Magnesia, though occasionally found in nature, is usually prepared artificially, on an extensive scale, by the double decomposition occurring when the solutions of sulphate of soda and carbonate of soda are mixed together. Dissolve four pounds nine ounces of carbonate of soda, and four pounds of sulphate of magnesia, separately, in two gallons (*Imperial measure*) of distilled water; mix the solutions, then boil for two hours, constantly stirring it with a spatula, and add a little distilled water now and then, so as to keep the measure

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* *Native Carbonate of Magnesia.*—Native Carbonate of Magnesia, or Magnesite, has been found at Hrubschitz, district of Gromau, in Moravia; at Baudissero and Castellamonte, villages in the vicinity of Turin, Piedmont; in the East Indies, and in the district of Kironile, in the Eubæa. Specimens of the Piedmontese Magnesite were exhibited under the name of Giobertite, in the Sardinian section of the Exhibition of 1851. It takes its name of Giobertite from Giobert, who established its true nature, it having passed for a long time for pure alumina. The Magnesite from Baudissero contains 68 per cent. of Magnesia, and that of Castellamonte 26.3 per cent. The native Carbonate from Moravia contains about 46 per cent. of Magnesia. The analysis by Dr. Henry of a sample of native Carbonate from a cargo imported by Mr. Babington from India, also gave 46 per cent. of Magnesia. It constitutes a range of low hills in Hindostan. In the Eubæa there are entire hills of it. The mines or quarries are situated in the villages of Limni, Kotsikia, and Matondi; the produce of the last named village is the best in quality. It is stated that upward of 2,000 tons are annually exported to Smyrna and England. The Eubæan Magnesite contains 44 per cent. of Magnesia. It is used for the manufacture of pure Magnesia, and, as mentioned in our last number, Epsom salt. It is a very useful ingredient in the composition of bricks for refractory furnaces, on account of its property of resisting the heat of fire. Specimens of native Carbonate of Magnesia from Madras, and of Epsom salt manufactured therefrom, were shown in the Exhibition of 1851; also specimens of Magnesite from Eubæa.

In England, Carbonate of Magnesia is found in combination with carbonate of lime, forming what is called Magnesian limestone or dolomite. The Magnesian limestone the same; then pour off the liquor, collect the precipitate, wash it well with boiling distilled water, and dry it.—*Lond.*

According to Durand, lump Carbonate of Magnesia is thus prepared: A solution of one hundred parts of sulphate of Magnesia is put into a vat heated by steam, and a solution of one hundred and twenty-five parts of crystallized carbonate of soda is slowly added, being quickly and constantly stirred; the temperature of the mixture is raised to 176° to expel carbonic acid, which holds some of the Magnesia in solution; the liquor is then decanted off the precipitate, and this is washed three times, by subsidence and decantation, with lukewarm water free from salts of

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extends from Newcastle to Nottingham. Annexed are the analyses of five specimens:—

	1	2	3	4	5
Carb. Lime	57.50	55.70	54.19	51.10	54.05
" Magnesia	39.40	41.60	41.37	40.20	38.58
Silica	0.80	—	2.53	3.60	1.80
Oxide of Iron	0.70	0.40	0.30	1.80	1.36
" Manganese	—	—	—	trace	1.50
Water and loss	1.60	2.30	1.61	3.30	2.71
	100.00	100.00	100.00	100.00	100.00

The preparation of Carbonate of Magnesia, the *Magnesia Alba* of P. L., 1787, was for several years a considerable secret in the possession of some particular persons. It formerly bore the name at Rome of Count Palma's powder. Many, however, are of opinion that the mode of preparation was carried from Germany to Italy. Lancisi, in 1717 (and it is said, Valentini, in 1707), and afterward Hofmann, in 1722, made public the process of manufacture. At that time it was extracted from the mother-liquor which remains after the crystallization of rough nitre (chloride of Magnesium) by precipitation with a solution of carbonate of potash or soda. The name *Miraculum Chemicum*, was given to it from the circumstance of a precipitate being formed by the admixture of two pellucid solutions.

Manufacture of Carbonate of Magnesia from Epsom Salt.—The manufacture of Carbonate of Magnesia from sulphate of Magnesia, was first made known by Henry, of Manchester. The process communicated by him was as follows: "Dissolve any quantity of sal catharticus amarus in its own weight of water; filter, and add to it by degrees a filtered solution of pearl or potashes, in an equal quantity of water, stirring them gently, until the mixed liquids have acquired the appearance of a complete coagulum. Then desist from adding any more of the alkaline lixivium, and immediately throw the mixture into a large vessel of boiling water; keep it boiling a quarter of an hour, then take it out and put it into glazed earthen vessels. As soon as the powder hath subsided, and before the water is quite cold, pour it off, and add a fresh quantity of boiling water; repeat these ablutions with hot water several times until the liquor has entirely lost its saline taste; then let it be so agitated as to suspend the finer parts of the powder, in which state decant it into other vessels, and having separated the water from the Magnesia, by inclination, put it on large chalk-stones, until a considerable part of the humidity is absorbed. Then wrap it up in sheets of white paper, and dry it before the fire. Pour hot water upon the remaining powder, stir and decant it in its turbid state, and separate the Magnesia from the water as before; thus the whole, or most of it, will be reduced to an equal degree of fineness. The larger the quantity of water into which the precipitated powder is cast, the more speedily and perfectly lime. It is then transferred to linen strainers, where it is allowed to drip from twenty-four to forty-eight hours, and is transferred in a wet state to cubical boxes without bottoms, placed upon a table of plaster or porous stone, so as quickly to absorb the water; after a time the boxes are turned upside down, so as to present the upper side of the Magnesia to the absorptive surface, and the drying is ultimately completed in warm rooms. —*P.*

History.—Carbonate of Magnesia is made, in this country, from the mother-water remaining after extracting common salt from sea or salt water by evaporation, and which is principally composed of Magnesian

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will the vitriolated tartar, which is formed by the union of the alkali with the acid of the sal catharticus, be washed off. The neutral salt should be washed off as quickly as possible, otherwise, by allowing the mixture to stand for some time, the powder concretes with minute grains, which, when viewed with a microscope, appear to be assemblages of needles diverging from a point. These concretions can not be redissolved by any washing, however long continued. Dr. Black orders four times the quantity of water to that of the solution for throwing the coagulum into; but Mr. Henry observes that this quantity is much too little. The water should be pure, and distilled water is the best. Hard or impure water makes magnesia coarse and disagreeable."

In the Pharmacopœias of the London and Edinburgh Colleges, carbonate of soda is directed to be employed in the manufacture of Carbonate of Magnesia from sulphate of Magnesia. The two *boiling hot* solutions are run together into large wooden vessels, while a workman keeps the whole in continued agitation for some time. The mixture is afterward allowed to remain at rest for an hour or so to permit the precipitated Carbonate of Magnesia to subside. When this deposit has taken place, the fine precipitate is repeatedly washed with pure water to remove all traces of the sulphate of soda formed by the double decomposition of the two salts. The Carbonate of Magnesia is then allowed to drain until it acquires sufficient consistency to be formed into small pieces of the shape of parallelopipedons, and then dried on wooden shelves in a stove at a low temperature.

On account of the great tendency of carbonic acid to form soluble bi-salts, it is necessary that the solutions of sulphate of Magnesia and carbonate of soda should be mixed *boiling* in the manufacture of Carbonate of Magnesia. The Magnesia Alba, or Carbonate of Magnesia of commerce, is a *subcarbonate*, consisting of a combination of neutral Carbonate of Magnesia and hydrate of Magnesia. The neutral Carbonate is a crystallizable salt, which may be frequently observed depositing in the bottles containing solutions of the bicarbonate in Murray's fluid Magnesia. This neutral Carbonate is decomposed when put into water. If the water be cold it is decomposed into Magnesia Alba and bicarbonate; if the water be boiling it is resolved wholly into Magnesia Alba or the subcarbonate, the excess of carbonic acid being expelled.

Heavy Carbonate of Magnesia.—Pereira gives the following as the method which he has seen followed in a large and esteemed manufactory: Add one volume of a cold saturated solution of carbonate of soda to a boiling mixture of one volume of a saturated solution of sulphate of Magnesia and three volumes of water. Boil until effervescence has ceased, constantly stirring with a spatula. Then dilute with boiling water, set aside, pour off the supernatant liquor, and wash the precipitate with hot water on a linen cloth. Afterward dry it by heat in an iron pot.

Manufacture of Carbonate of Magnesia from Bittern.—In the manufacture of Carbonate of Magnesia from bittern (chloride of Magnesium), or the mother-liquor remaining after the extraction of common salt from sea-water, the crude carbonate of ammochloride and sulphate. Two kinds of Carbonate of Magnesia are known and kept in the shops—the *light*, and the *heavy*. The first is manufactured in the Northern parts of Great Britain, and is termed *Scotch Magnesia*; it is largely imported into this country, in cases nearly treble the size of the American article. According to Mr. Richard Philips, jun., the following directions will yield a heavy Carbonate: Mix a solution of one hundred and twenty-three parts of crystallized sulphate of Magnesia with a solution of one hundred and forty-four parts of crystallized carbonate of soda, and boil to dryness. Then treat the residue with water until all the soluble matter (sulphate of soda) is removed, and dry the residual

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nia, obtained in the distillation of bones or the ammoniacal liquor of gasworks, is used as the decomposing agent. In this case Carbonate of Magnesia is precipitated and muriate of ammonia obtained in solution. The after treatment is the same as that described above. Dolomite is also employed for the decomposition of bittern in the same way as that of artificial Chloride of Magnesium. In this process the carbonate of lime of the dolomite becomes converted into chloride of calcium, leaving the Carbonate of Magnesia behind as an insoluble powder.

Manufacture of Carbonate of Magnesia from Dolomite.—In his patent of January 23, 1852, Dr. Richardson claims the manufacturing of Magnesia and Carbonate of Magnesia from Magnesian limestone by the employment of muriatic acid. The quantity of acid used should be slightly in excess of the exact quantity required to dissolve out the lime in the limestone operated upon. This may be either burnt to expel the carbonic acid, and then slaked in pits previous to adding the muriatic acid, or it may be employed in the natural state, reduced to an impalpable powder, the product in the former case being Magnesia, and in the latter an impure carbonate, which may either be employed as such, or be deprived of its carbonic acid by the application of heat. The acid preferred for this purpose is the weak muriatic acid, which is at present allowed to run to waste in alkali works, and the proportion of it used is a quantity containing about thirty-seven parts of pure hydrochloric acid to every twenty-eight parts of lime in the calcined Magnesian limestone, and the same for every fifty parts of carbonate of lime in the uncalcined stone.

The Magnesia, or Carbonate of Magnesia thus obtained, Dr. Richardson employs in the manufacture of Magnesian salts, as noticed in the article on "Epsom Salt" in the last number of the Pharmaceutical Journal. He also manufactures Carbonate of Magnesia by causing a stream of carbonic acid to be forced through vessels containing Magnesia obtained as before mentioned, diffused through water. A bicarbonate is thus produced, which enters into solution with the water, and this is subsequently converted into carbonate, which is obtained as a precipitate by the application of a gentle heat to the vessel containing the solution of bicarbonate.

The best process for the manufacture of Carbonate of Magnesia is undoubtedly that patented by Mr. H. L. Pattinson, Sept. 24th, 1841. The process is as follows: Magnesian limestone, as rich as possible in Magnesia, is reduced to powder and sifted through a sieve of forty or fifty meshes to the linear inch. It is then heated red hot in an iron retort or reverberatory furnace for two or three hours, when the carbonic acid being expelled from the Carbonate of Magnesia, and not from the carbonate of lime, the whole is withdrawn from the retort or furnace, and allowed to cool. The Magnesia contained in the limestone is now soluble in water impregnated with carbonic acid gas, and to effect this solution, Mr. Pattinson proceeds as follows: An iron cylinder lined with lead, of any convenient size, say four feet long by two feet and a half in diameter, is provided, furnished with a safety-valve and agitator, which latter may be powder. Carbonate of soda is said to impart to it its softness and fineness, and the stronger the solutions from which it is precipitated, the greater will be its density.

Officinal Carbonate of Magnesia is a pure white powder, loose, and granular if dense, but somewhat coherent, like starch, if light,—odorless, almost tasteless, permanent in the air, and feebly alkaline in its action on vegetable colors. It is slightly soluble in water, and more readily in cold than hot water; if the water be charged with carbonic acid, it is rendered much more soluble, requiring only forty-eight parts of this fluid for its solution. It is soluble in diluted nitric, muriatic, sulphuric, or carbonic acids, and effervescence takes place.

" The *incompatible* substances with this salt are, acids and acidulous

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an axis in the center of the cylinder, with arms reaching nearly to the circumference —all made of iron and covered with lead. This cylinder is placed horizontally, and one extremity of this axis is supported within it by a proper carriage, the other extremity being prolonged, and passing through a stuffing-box at the other end of the cylinder, so that the agitator may be turned round by applying manual or other power to its projecting end. A pipe leading from a force-pump is connected with the under side of the cylinder, through which carbonic acid gas may be forced from a gasometer in communication with the pump, and a mercurial guage is attached to show at all times the amount of pressure within the cylinder, independently of the safety-valve. Into this cylinder, so fitted up as described, from 100 to 120 lbs. of the calcined limestone is introduced, with a quantity of pure water nearly filling the cylinder; carbonic acid gas is next pumped in, the agitator constantly turned the while, and more and more gas forced in, until absorption ceases under a pressure of five atmospheres. The whole is allowed to remain in this condition for three or four hours, and the contents of the cylinder are then run off into a cistern and allowed to settle. The clear liquor is now a solution of Carbonate of Magnesia in water, impregnated with carbonic acid gas, or a solution of bicarbonate of Magnesia having a sp. grav. of about 1028, and containing about 1600 grains of Carbonate of Magnesia to the imperial gallon.

Mr. Pattinson considers the best mode of obtaining a solution of bicarbonate of Magnesia from Magnesian limestone, is to operate upon the limestone after being calcined at a red heat in the way described, but the process may be varied by using in the cylinder the mixed hydrates of lime and Magnesia, obtained by completely burning Magnesian limestone in a kiln, as commonly practiced, and slaking it with water in the usual manner, or, to lessen the expenditure of carbonic acid gas, the mixed hydrates may be exposed to the air for a few weeks, until the lime has become less caustic by the absorption of carbonic acid from the atmosphere, or the mixed hydrates may be treated with water as practiced by some manufacturers of Epsom salt, until the lime is wholly or principally removed, after which the residual rough hydrate of Magnesia may be prepared for solution in the cylinder by dissolving Magnesian limestone in hydrochloric acid, and treating the solution, or a solution of chloride of Magnesium, obtained from sea-water by salt-makers in the form of bittern, with its equivalent quantity of hydrate of lime, or of the mixed hydrates of lime and Magnesia obtained by completely burning Magnesian limestone and slaking it as above. Mr. Pattinson states that, when he uses this solution of bicarbonate of Magnesia for the purpose of preparing Carbonate of Magnesia, he evaporates the solution to dryness, by which he at once obtains a pure Carbonate of Magnesia, without the necessity of using a carbonated alkali as in the old process; and from this he prepares pure calcined Magnesia by calcination in the usual manner, or, instead of boiling the solution to salts, alkalies and neutral salts, alum, cream of tartar, nitrate of mercury, acetate of mercury, bi-chloride of mercury, di-acetate of lead, sulphates of zinc, iron, and copper."—*Coxe.* Exposed to a red heat it is reduced to Magnesia, the carbonic acid being driven off; alkalies, baryta, strontia, etc., remove its acid, forming carbonates, and leaving a deposit of Magnesia. "Berzelius, whose doctrine is most current, supposes it to be a compound of three equivalents of the hydrated neutral carbonate, with one equivalent of hydrated Magnesia."—*C.* Mr. Phillips considers it to be probably a compound of one atom of bi-hydrated Magnesia, and four atoms of hydrated Carbonate of Magnesia.—*P.* According to Pereira its formula is $5\ Mg\ O\ 4\ CO_2\ 6\ HO$; or $4\ (Mg\ O\ HO\ CO_2) + Mg\ O\ 2\ HO$—and its equivalent weight 242.

Under the microscope, light Carbonate of Magnesia is an amorphous powder, with slender, eroded, or efflorescent prisms intermixed; the heavy carbonate is granular, without the prismatic crystals, and the larger granules are globular, highly refracting, and exhibit concentric layers of a radiated structure.—*P.*

The impurities of Carbonate of Magnesia are similar to those of Mag-

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dryness he merely heats it for some time to the boiling point, by which excess of carbonic acid is partly driven off and pure Carbonate of Magnesia precipitated, which is collected and dried in the usual way.

Manufacture of Carbonate of Magnesia from Magnesite.—Dr. Richardson's more recent improvements in the manufacture of Carbonate of Magnesia are contained in the specification of his patent, dated June 14, 1853. He takes any impure hydrate, or Carbonate of Magnesia, free from lime, or nearly so, such for instance as *magnesite* (the impure hydrate of Magnesia, which is a waste product in Ward's process of carburating soda ash, being preferred) and diffuses it through water, so as to form a cream or milk-like fluid, which he runs into a large soda-water machine, wherein he pumps carbonic acid, in the same manner as when making soda-water. Or, he partially fills a wooden box, divided into cells by partitions running from the top and bottom alternately, with this milk-like fluid, and by means of a steam-jet, or air-pump worked by suitable machinery, he draws a stream of carbonic acid through the whole series of compartments from a furnace filled with coke or charcoal. When the liquid becomes saturated with bicarbonate of Magnesia, or stands at 5° to 11° on Twaddell's hydrometer (sp. grav. 1.025 to 1.055), it is drawn off, and after standing about an hour a small quantity of a cream of Magnesite is gradually added, which he finds carries down all the oxide of iron and other impurities, leaving a clear pure solution of bicarbonate of Magnesia. This solution is heated to expel the excess of carbonic acid, when the carbonate precipitates, and is collected and treated in the usual way, or a quantity of pure Magnesia in suspension in water is added until the whole is precipitated as Carbonate of Magnesia. The furnace employed for producing carbonic acid is filled with coke or charcoal, and is supplied with air through an opening at the bottom, and another higher up on a level with the top of the fuel. The air may be drawn through by means of a jet of steam, or otherwise, or forced forward by a blowing cylinder or fan-blast, so regulated by valves or dampers that the supply of air entering at the upper opening shall be a little more than sufficient to convert all the carbonic oxide into carbonic acid, so as to economize the fuel and render the action of the gas more energetic on the milk of Magnesia. Carbonic acid obtained from any other source equally answers the purpose.—*Pharm. Jour. and Trans. XIV.*, 221.

nesia, and usually occur from carelessness in the process of manufacturing. If water, in which Carbonate of Magnesia is boiled, changes turmeric paper, it contains an alkaline carbonate. If chloride of barium causes a precipitate in the water, it indicates the presence of a sulphate or carbonate, or both. If nitrate of silver produces a precipitate, a chloride is present, probably of sodium. Alumina is separated from the muriatic acid solution by an excess of ammonia—the solution to be made in an excess of the acid. And after the alumina has been thrown down, if lime be present, the addition of oxalate of ammonia will cause a precipitate of oxalate of lime.

Properties and Uses.—Carbonate of Magnesia is antacid, antilithic, and purgative when it meets with an acid in the alimentary canal, but not without. Hence, it is always useful to give it in combination with lemonade or lemon-juice. It has proved useful in cases of acid stomach, gout, and where the urine contains an excess of uric acid; but from its liability to occasion flatus, owing to the escape of its carbonic acid gas, when in the intestines, it is inferior to calcined Magnesia. Dose, as an antacid and antilithic, one or two scruples; as a cathartic, one or two drachms in water or milk. In preparing camphor, and other medicated waters, Carbonate of Magnesia by trituration, aids materially in diffusing the essential oils, etc., through the water.

Off. Prep.—Liquor Magnesiæ Citratis.

MAGNESIÆ SULPHAS.

Sulphate of Magnesia. (*Epsom-Salts.*)

Preparation.—Sulphate of Magnesia, commonly known as Epsom-Salts, exists abundantly, in sea water, and in some mineral springs. For its artificial manufacture, several processes are followed, the most important of which are as follows: When prepared from Bittern Water, or the residual brine after crystallizing salt from sea water, it is accomplished by simple evaporation and crystallization. A little Sulphuric Acid is added to the bittern in order to convert the chloride of magnesium, which forms part of its saline ingredients, into the sulphate. It is then carefully evaporated, and the Sulphate of Magnesia crystallizes, leaving behind the chlorides of magnesium and calcium. It is then collected, and any impurities it may contain removed by washing the crystals in water, or by chemically precipitating the impurities, filtering, and evaporating. However, the Sulphate of Magnesia obtained by this process is very apt to deliquesce from the presence of foreign bodies.

It is also prepared from Dolomite, a magnesian limestone, composed of carbonate of lime and carbonate of magnesia; the carbonates may be converted into sulphates, and the latter separated by means of the inferior solubility of the sulphate of lime. Or the dolomite may be calcined, thereby driving off the carbonic acid, and converting the remaining earths into hydrates; then Muriatic Acid is added in such quantity as to unite with the caustic lime only, and the chloride of calcium being removed by solution in water, the magnesia is converted into the sulphate by means of sulphuric acid. It is likewise prepared from *magnesite*, a siliceous hydrate of magnesia, a mineral which is common among some of the rocks of southern Pennsylvania and northern Maryland. It is finely pulverized, treated to saturation with Sulphuric Acid, dried, and then calcined to peroxidize any iron which may exist in it. An aqueous solution is now formed, from which any remaining iron is removed by the addition of Sulphuret of Lime; the solution is then evaporated to crystallization, and the salt purified by redissolving and crystallizing. The Sulphate of Magnesia thus prepared is usually free from impurities. This salt is frequently met with as a native production in large masses of eight or twelve pounds, and as an efflorescence on some grounds, and is also found in several of the large caves of the Western States.

History.—Sulphate of Magnesia was discovered in 1694 by Grew, who prepared it from the saline waters of Epsom in England, from whence it has derived its familiar name, *Epsom-Salts;* at present it is usually met with in small acicular crystals, transparent and colorless, inodorous, of a cooling, saline, bitter, disagreeable taste, and slightly efflorescent in dry air. When slowly crystallized it forms large rhombic or quadrangular prisms, often truncated on the obtuse edges, and terminated by two or four converging planes, somewhat like the crystals of sulphate of Zinc, and sulphate of Soda. A moderate heat causes it to fuse in its water of crystallization; a higher temperature renders it anhydrous; and at a full red-heat the anhydrous salt melts into an enamel. It is insoluble in alcohol, soluble in its own weight of water at 60°, and in three-fourths of its weight at 212°. "It is decomposed by baryta, strontia, the alkalies, and all the salts formed by these salifiable bases, excepting the alkaline muriates; and by the nitrate, muriate, and carbonate of lime."—*Coxe.* Alkalies and lime throw down magnesia from the aqueous solution; the alkaline carbonates precipitate carbonate of magnesia. The fixed alkaline bicarbonates decompose it only when heat is applied. Sulphate of Magnesia consists of an equivalent, each, of base and of acid, and seven equivalents of water, its equivalent weight being 123, and its formula $MgO+SO_3+7\ Aq$. The anhydrous salt has the formula $MgO+SO_3=60$.

This salt is liable to various impurities, but as now prepared is generally quite free from them; the most common are iron, and chloride of magnesium. When *iron* is present, the solution gives a violet or bluish-black precipitate with tannic acid, and a blue or bluish-white precipitate with ferrocyanuret of potassium. If *chloride of magnesium* be present, the salt will be more or less deliquescent, according to the amount of chloride contained in it; a solution of nitrate of silver added to a dilute solution of sulphate of magnesia in which the chloride exists, will cause a precipitate. If *chloride of lime* be present, oxalate of ammonia will cause a precipitate. *Copper* will give a chocolate colored precipitate with ferrocyanuret of potassium, and a blue one with ammonia. If tartaric acid when added to a concentrated solution causes, on agitation, a crystalline precipitate, *potassa* is present. The presence of *chlorides* may be known by the evolution of hydrochloric acid gas when the sulphate is acted on by sulphuric acid.

To detect the presence of sulphate of soda, ten grains of the salt are to be dissolved in a fluidounce of water, and treated with a solution of sesquicarbonate of ammonia; 280 minims of a solution of one part of phosphate of soda in twenty parts of water are then added, which precipitates 97 per cent. of the magnesia in a pure sulphate, leaving a little magnesia in the solution. Filter the solution, and add to it more of the phosphate of soda solution, if no more magnesia is thrown down, the salt must contain something else than Sulphate of Magnesia.—*Ed.*

Properties and Uses.—Refrigerant, cathartic and diuretic. Chiefly used in febrile and inflammatory affections, or in cases where a refrigerant, mild laxative effect is desired. It may be dissolved in eight times its quantity of water. The addition of four or five drops of sulphuric acid to the dose covers the bitter taste of the salt, causes it to sit easier on the stomach, counteracts its refrigerant effects, does not impair its energy, completely removes its tendency to gripe or irritate the rectum, and prevents it from interfering with the appetite or digestion. M. Combes states that the bitterness of this salt may be removed, by the following means: Take of Sulphate of Magnesia one ounce, powder of roasted coffee two and a half drachms, water about sixteen ounces. Place in a vessel (not a tin one), and boil for two minutes, remove from the fire, and let the mixture infuse for some minutes, so as to allow time for the development of the aroma; then strain and sweeten to the taste. By this process the salt is not decomposed. Should it be required to increase the amount of the sulphate without augmenting the proportion of coffee, two or three grains of tannic acid should be added to the boiling decoction. Dose of the powder, from two drachms to two ounces. Less used than formerly.

MAGNOLIA GLAUCA.

Magnolia.

Nat. Ord.—Magnoliaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE BARK.

Description.—This tree is known by several names, as *White bay*, *Beaver-tree*, *Sweet Magnolia*, *Swamp Sassafras*, etc. This tree varies in height from six feet to thirty or more, being taller in the south and shorter in the north; its average height is about twenty-five feet. The bark of the trunk is smooth and ash-colored, and that of the young twigs is a bright, smooth green, scarred with rings at the insertion of the leaves by the fall of the deciduous stipules. The branches are crooked and spreading. The *leaves* are alternate, petioled, regularly elliptical, entire, smooth, thick; their under side, except the midrib, of a pale, glaucous color; when young covered with a silken pubescence. The *flowers* are large, solitary, terminal, cream-colored, of a grateful odor, and stand on a short incrassated peduncle. The *calyx* is composed of three, spathulate, obtuse, concave sepals; the *corolla* consists of from eight to fourteen, obovate, obtuse and concave petals, which are contracted at their base. The *stamens* are very numerous, and are inserted in common with the petals on the sides of a conical receptacle; *filaments* very short; *anthers* linear, mucronated, two-celled, opening inwardly. *Ovaries* collected into a cone, each divided by a furrow, and tipped with a brownish, linear, recurved style. *Fruit* a cone, consisting of imbricated cells, which open longitudinally at the back for the escape of the seed. *Seeds* obovate, scarlet, connected to the cone by a funiculus, which suspends them some time after they have fallen out.—*L.*—*B.* It is found in swamps and morasses from Massachusetts to the Gulf of Mexico, and always in maritime districts; flowering from May to August, according to the climate in which it is located. At the south it is known as *White-bay*, or *Sweet-bay.* Although the flowers yield a delicate, agreeable odor, yet it sometimes occasions unpleasant symptoms, as difficult breathing, tendency to faint, etc.

MAGNOLIA ACUMINATA, or *Cucumber Tree*, is a tree reaching from sixty to eighty feet in height, and four or five feet in diameter, with a perfectly straight trunk. The *leaves* are oval, acuminate, green, and a little pubescent beneath, scattered, about six inches long, and half as broad. The *flowers* are five or six inches in diameter, bluish, sometimes yellowish-white, numerous, faintly fragrant; *petals* six to nine, obovate, obtusish. The cones are about three inches long, cylindric, bearing some resemblance to a small cucumber. This tree grows near the Falls of Niagara, and in the mountainous regions in the interior of the country from New York to Georgia; it is more abundant in the Southern States. Its flowers appear in May and June.—*W.*—*G.*—*B.*

MAGNOLIA TRIPETALA, or *Umbrella Tree*, the M. Umbrella of *Lamark*, is a small tree not exceeding thirty feet in height, and generally having a sloping trunk. Its *leaves* are from sixteen to twenty inches long, by six or eight in width, obovate, lanceolate, pointed at both ends, silky when young, soon smooth, and often appearing whorled at the ends of the branches in the form of an umbrella, displaying a surface thirty inches or more in diameter. The *flowers* are terminal, white, seven or eight inches in diameter, with from five to twelve, narrow lanceolate, acute petals, of which the three outer are curved. The *fruit* is conical, rose-colored, and from four to five inches in length. This tree is found growing in shady situations, in strong, deep, fertile soil, in the same range of country as the *M. Acuminata*, being, however, more generally confined to the lower grounds. It also flowers in May and June.—*W.*—*G.*—*B.*

History.—All the species of these trees possess similar therapeutical virtues, which are found especially in the bark and fruit. The bark is the officinal part, either of the trunk or root; its odor is aromatic, and its taste warm, bitterish and pungent, though, these properties, with the exception of the bitterness; are lost by age. The bark is taken off during the spring and summer; it is ashen, smooth, and silvery externally, white and fibrous internally. It has not been analyzed, but probably contains volatile oil, resin, and *magnolin.* Water or alcohol extracts its virtues.

Properties and Uses.—Magnolia Bark is an aromatic tonic bitter of much efficacy, and appears likewise to possess antiperiodic properties. Intermittent fevers have been cured by it after cinchona had failed. It is not so apt to disagree with the stomach and bowels, nor to induce fullness of the head as the Peruvian bark, and can be continued a longer time with more safety in all respects. Its curative agency is said to be favored by the diaphoretic action which generally follows its administration. In dyspepsia, with loss of tone in the stomach, it is very useful as a tonic, and has also proved of much service in the treatment of remittents with typhoid symptoms. A warm infusion acts as a gentle laxative and sudorific; a cold one as a tonic and antiperiodic, as does also the tincture and powder. The powder is considered the preferable form of administration. The bark of the *M. Tripetala*, chewed as a substitute for tobacco, has cured an inveterate tobacco chewer of the filthy habit, and deserves a further trial among those who wish to break up the pernicious practice. The bark in powder may be administered in half-drachm or drachm doses, to be repeated five or six times a day; the infusion may be taken in wineglassful doses, repeated five or six times a day. It is used in the above forms of disease, as well as in chronic rheumatism. The tincture, made by adding an ounce of the powder to a pint of brandy, and allowing it to macerate for ten or twelve days, may be given in tablespoon doses three times a day, for the same purposes. A tincture made by adding two ounces of the cones to a pint of brandy, has long been used as a domestic remedy for dyspepsia and chronic rheumatism; it is given three or four times a day in doses of from one to four fluidrachms. Magnolia is contra-indicated whenever inflammatory symptoms are present.

MALVA SYLVESTRIS.

Common Mallow.

Nat. Ord.—Malvaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE HERB.

Description.—This is a perennial hairy herb, sometimes called *High-mallow;* it has a tapering, branching, whitish root, and an erect round *stem* two or three feet high. The *leaves* are alternate, deep green, soft and downy, serrated, plaited, with seven acute lobes, on hairy petioles; the uppermost with fewer, but deeper, and more acute lobes, than the lower ones. The *flowers* are large, numerous, of a shining purple, veiny, on simple, aggregate, hairy axillary stalks. The *calyx* is five-cleft. *Petals* five, inversely cordate, and thrice the length of the calyx. *Stamens*, indefinite, monadelphous. *Pollen* large, whitish. *Ripe carpels* reticulated at the back.—*L.*—*G.*

MALVA ROTUNDIFOLIA, or *Low-mallow*, called by children who are fond of eating the fruit, *cheeses*, has a fusiform root and prostrate *stem*, with *leaves* of a fine, delicate texture, roundish, cordate, or somewhat uniform, crenate, obtusely five or seven lobed, and on long hairy petioles. The *flowers* are pale-pink, with deeply-notched petals, and stand on aggregate, axillary peduncles. The *fruit* is depressed-globose, and composed of the numerous carpels arranged circularly.—*W.*

History.—The M. Sylvestris is a native of Europe, and is naturalized in this country, growing abundantly in fields, roadsides, and waste places, and flowering from May to October. The whole plant, especially the root, abounds in mucilage. The M. Rotundifolia, a very common, troublesome plant growing around dwellings and in cultivated grounds, together with other species of this genus, possesses similar properties, and may be substituted for each other. The herb and flowers are inodorous, with a weak, herbaceous, mucilaginous taste. Water extracts their mucilage, and acetate of lead precipitates the solution. The root and seeds may be also used, as they contain much mucilage. The blue infusion, or tincture of the flowers, is turned green by alkalies, and red by acids, and forms an exceedingly delicate test of these agents.

Properties and Uses.—Mallows possesses the properties common to mucilaginous herbs. An infusion forms an excellent demulcent in coughs, irritations of the air-passages, flux, affections of the kidneys and bladder, etc. It may also be used in injection. The herb, bruised, forms a good emollient cataplasm to boils, and inflammatory conditions of external parts.

MANGANESII BINOXIDUM.

Binoxide of Manganese.

History.—Manganese has long been known and used in the manufacture of glass, and was commonly considered an iron ore, until in 1770, when Kaim succeeded in extracting a peculiar metal from it, *manganese*, *manganesium*, or *manganum*, having the formula Mn, and equivalent weight 28. It may be procured by placing the pure oxide or carbonate of Manganese into a covered crucible lined with charcoal, and expose it to a very violent heat for four hours, it will be reduced to the metallic state and fused into a solid mass. Thus obtained it has a gray color, somewhat whiter than cast iron, finely granular in texture, hard, and so brittle that it can be reduced to powder in a mortar. Its specific gravity is 8.013. It has a strong affinity for oxygen, gradually absorbing it from the atmosphere. It decomposes water rapidly at a red heat, hydrogen being disengaged. There are two acids and four oxides of this metal, produced by the action of oxygen upon it. Thus *manganic acid*, $Mn\ O_3=51.739$, but which is known only in combination with potassa, forming a manganate of potassa. *Permanganic acid*, $Mn_2\ O_7=111.491$, which is also known in combination with potassa, the permanganate of potassa being formed when chameleon mineral is dissolved in hot water; chameleon mineral is made by igniting peroxide of Manganese strongly with nitre, or, still better, by heating a mixture of peroxide, chlorate of potassa, and caustic potassa. *Binoxide* (also called *deutoxide*, *peroxide*, or *black oxide*) of Manganese, occurs in considerable abundance, and constitutes the mineral which Haidinger termed *pyrolusite*, from whence all the oxide of Manganese used in the arts is obtained. It exists in various parts of Europe, and some in this country, the purest varieties being found in Great Britain and Germany. More commonly it is more or less impure from the presence of lime, alumina, baryta, and oxide of iron. *Protoxide of Manganese*, $Mn\ O=35.713$, is a pale grass-green powder, obtained by passing a current of dry hydrogen gas over Binoxide of Manganese, heated in a glass tube, but not to redness. It very speedily becomes yellow, and then brown, by absorbing oxygen from the atmosphere, which it does very quickly. *Sesquioxide of Manganese*, $Mn_2\ O_3=79.439$, is left behind when the peroxide is ignited in preparing oxygen gas; it is of a dark-brownish color, yields no oxygen when ignited, and occurs native in considerable quantity both anhydrous and in the state of hydrate. Haidinger called the hard, grayish black anhydrous sesquioxide, *braunite;* the hydrate is the mineral Manganite. *Red oxide of Manganese*, $Mn_3\ O_4=115.152$, occurs in nature, and may be obtained when any other oxide of Manganese is strongly ignited in an open crucible; it is supposed to be a compound of one equivalent each of the sesquioxide, and protoxide. Varvicite, $Mn_4\ O_7=166.8$, is another oxide found in Warwickshire, and is supposed to be a compound of two other oxides $Mn_2\ O_3+2\ Mn\ O_2$. It resembles binoxide, but is of foliated texture, and has a stronger luster.

The Binoxide of Manganese is the one used in medicine; it occurs massive, columnar, crystallized, and pulverulent—the crystals are right rhombic prisms, or in accreted needles. Its color is iron-black or brownish, tasteless, odorless, permanent in the air, insoluble, and soils the fingers in handling it. Its powder is dark-grayish black. Its specific gravity is stated to vary from 4.7 to 4.9. When heated to redness, it loses one-fourth of its oxygen, leaving sesquioxide; at a white heat it loses about half its oxygen, leaving protoxide. Heated with common salt and sulphuric acid, it yields chlorine. Heated with sulphuric acid, it loses half its oxygen, and forms a soluble sulphate of the protoxide of Manganese. It is infusible before the blow-pipe, dissolves in fused borax with effervescence, and gives to the globule an amethystine color. If it be digested in hydrochloric acid until chlorine ceases to be evolved, the addition of ferrocyanuret of potassium will color it green or blue if iron be present. Iron is almost always in this oxide, the crystals being the most free from it; if to the hydrochloric solution, we add a slight excess of ammonia, the sesquioxide of iron is precipitated. The formula of the binoxide is $Mn\ O_2 = 43.726$.

Properties and Uses.—The actions of this oxide upon the system are but imperfectly understood. Dr. Coupar, of Glasgow, considers it to act as a cumulative poison, producing paralysis of the motor nerves, but without causing colic, constipation, or tremors. It has been used internally in many cutaneous diseases, as herpes, scabies, and in the scorbutic diathesis. It has likewise been found efficacious in scrofula, chlorosis, syphilis, and in anemia. From three grains to a scruple may be given, in pill form, every three or four hours. Externally, a drachm mixed with half an ounce of lard, has been found advantageous as an application to itch, porrigo, and old ulcers. One part of Binoxide of Manganese, added to five or ten parts of chlorate of potassa, and subjected to a moderate heat in a glass or iron retort, gives out a rapid flow of oxygen gas, which may be collected for various purposes.

Dr. J. Kovascy recommends the following formulæ: Take of Binoxide of Manganese four grains, Extract of Savin, Extract of Aloes, each, ten grains; mix and divide into six pills, of which one pill may be given three times a day. 2. Take of Binoxide of Manganese three grains, powdered leaves of digitalis one grain, sugar of milk eight grains; mix, and divide into six powders, of which three are to be taken daily. These are said to be useful in chlorosis and amenorrhea.

The following salts of Manganese have been recently recommended to the profession:—

PERMANGANATE OF POTASSA.—This salt has beeen recommended in the treatment of diabetes, by Mr. Sampson, of London. Gregory's process for preparing it is, to add to a finely divided mixture of eight parts of Binoxide of Manganese and seven parts of chlorate of potassa, a solution of ten parts of hydrate of potassa in a very small quantity of water, and evaporate to dryness; ignite the finely powdered mass in a platinum crucible over a spirit-lamp till the whole of the chlorate of potassa is decomposed (for which a low red heat is sufficient). The mass when cold is boiled with a small quantity of water, whereupon the green color of the solution changes to a red; finally, the liquid is decanted from the peroxide of Manganese while still hot, and set aside to crystallize by cooling. The crystals are of a deep-purple hue, and require sixteen parts of water to dissolve them; they are permanent in the air, and have the formula $K\ O,\ Mn_2\ O_7$. The dose found to agree best with the stomach is about three grains, given in three or four tablespoonfuls of water three times a day, a little before meals; as much as ten or twelve grains have been given, but the dose should be gradually increased. I have not found any encouraging effects from the use of this salt in diabetes.

PROTOCHLORIDE OF MANGANESE, *Manganesii Chloridum*, or Muriate of Manganese.—Formed by dissolving pure Binoxide of Manganese in hydrochloric acid, evaporating the solution to dryness, and exposing the white salt that remains to a red heat in a glass tube with a very narrow orifice. It consists of thin, broad, delicate light-pink plates, which fuse in close vessels without alteration, at a red heat, and when exposed to the air deliquesce. They are very soluble in water and alcohol, and have the specific gravity 1.56. They are inodorous, and have a saline astringent taste. Their formula is $Mn\ Cl = 63.15$. This has been recommended in chronic diseases of the skin, in scorbutic affections, and syphilitic diseases, in doses of from three to ten grains in watery or alcoholic solution. A drachm or two dissolved in a pint of water has been used as a gargle in syphilitic ulceration of the mouth and throat. The alcoholic solution has been used internally to check epistaxis, giving ten or twenty drops every four hours, until a feeling of giddiness is perceived.

SULPHATE OF MANGANESE. Manganesii Sulphas.—This salt is easily formed by dissolving carbonate of Manganese in diluted sulphuric acid, filtering and evaporating the solution so as to crystallize. The crystals are very oblique rhombic prisms, transparent, with a slight shade of red; they are slightly efflorescent in the air, have a bitter strongly saline taste, are of specific gravity 2.877, are soluble in water, and insoluble in alcohol. When the water of crystallization is driven off by heat, they form a white, friable mass. Their formula is $Mn\ O, SO_3 = 76$. Sulphate of Manganese appears to be a stimulant to the lymphatic system of vessels and glands, and has been found valuable in anemic conditions of the system, accompanied with a deficiency of the white corpuscles of the blood. It acts as a powerful cholagogue, causing a profuse secretion of bile, and has been used with efficacy in scrofula, chlorosis, jaundice, torpid liver, disease of the spleen, and cachexia. The dose is from five to twenty grains, three times a day. A drachm or two, dissolved in a half-pint or pint of water, will act as a prompt purgative, with scarcely any depression of the system. Large doses, or its long continued use in small doses, injures the tone of the stomach. One drachm of the sulphate mixed with one ounce of lard, has been used externally, as an ointment, in buboes, chancres, indolent ulcers, and some diseases of the skin.

SYRUP OF IODIDE OF IRON AND MANGANESE has been recommended in anemia, scrofula, cancer, and glandular enlargements. Prof. W. Procter, jr., gives the following formula for its preparation: Take of iodide of potassium 1,000 grains, proto-sulphate of iron 630 grains, proto-sulphate of Manganese 210 grains, iron-filings (free from rust) 100 grains, coarsely powdered white sugar 4,800 grains, distilled water a sufficient quantity. Triturate the sulphates and the iodide separately to powder, mix them with the iron-filings, add half a fluidounce of distilled water, triturate, and allow it to rest fifteen minutes. A third addition of water should now be made and mixed. The sugar should then be introduced into a bottle capable of holding a little more than twelve fluidounces, and a small funnel, prepared with a moistened filter, inserted into its mouth. Remove the magma of salts from the mortar to the filter, and when the dense solution has drained through, add carefully and in small portions, some distilled water, until the solution of the iodides is displaced and washed from the magma of crystals of sulphate of potassa. Finally, finish the measure of twelve ounces, by adding sufficient distilled water, and agitate the bottle until the sugar is dissolved. The solution of the sugar may be facilitated, when desirable, by standing the bottle in warm water for a time, and then agitating. Each fluidounce of this syrup contains fifty grains of the mixed anhydrous iodides in the proportion of three parts of iodide of iron to one part of iodide of Manganese, and the dose is from ten to thirty drops.—*Am. Jour. Pharm.*, *CIV.*, 199.

SYRUP OF IODIDE OF MANGANESE has also been successfully used in the same class of diseases as the preceding. Prof. Procter directs it to be made as follows: Take of sulphate of Manganese sixteen drachms, iodide of potassium nineteen drachms; dissolve these salts separately, each, in three fluidounces of water, to which two fluidrachms of syrup have been previously added. Mix these two solutions in a glass-stoppered bottle, and when the resultant crystals of sulphate of potassa are all precipitated, filter the supernatant liquor, through a fine muslin strainer, into a vessel containing twelve ounces of pulverized sugar. Add to this sufficient water to make the whole measure sixteen fluidounces. A fluidounce of this syrup contains about sixty grains of iodide of Manganese; its dose is from ten drops to half a fluidrachm, repeated three or four times a day. Combined with cinchona, it is very efficacious in ague-cake, or diseased spleen following intermittent fevers.

Various other preparations of Manganese have been used and recommended by various physicians for nearly similar purposes, as the malate, carbonate, tartrate, phosphate, lactate, etc.; but their actions appear to be very nearly alike. Dr. T. S. Speer, of England, gives the following formula for a *Saccharine Carbonate of Iron and Manganese*, which has proved very useful in anemia: Take of finely powdered sulphate of iron twenty-five drachms, carbonate of soda five ounces, sulphate of Manganese twenty-five scruples, dissolve these, each, in a pint and a half of water (Imperial measure), then add the solutions together, and mix them well. Collect the precipitate on a filter of cloth, and immediately wash it with cold water; squeeze out as much of the water as possible, and, without delay, triturate the pulp with the sugar, previously reduced to a fine powder. Dry it at a temperature of about 120° F. It forms a reddish-brown powder, having only a saccharine taste, and may be given in doses of five grains, three times a day, gradually increased to one scruple. It should be given immediately after each meal.—*Am. Jour. Pharm.*, *CIX.*, 128. The compounds of iron and Manganese cure cases of anemia in which iron alone fails.

MARANTA ARUNDINACEA.

Arrow-root Plant.

Nat. Ord.—Marantaceæ. *Sex. Syst.*—Monandria Monogynia.

THE FECULA OF THE TUBERS, ARROW-ROOT.

Description.—This plant has a perennial *rhizoma*, which is fibrous, producing numerous fusiform, fleshy, scaly, pendulous tubers from its crown. The *stems* are two or three feet high, much branched, slender, finely hairy, tumid at the joints. The *leaves* are alternate, with long, leafy, hairy sheaths, ovate, lanceolate, slightly hairy underneath, pale-green on both sides. The *flowers* are white, and disposed in a long, lax, spreading, terminal panicle, with long, linear, sheathing bracts at the ramifications. *Calyx* green, smooth; *corolla* white, small, unequal, one of the inner segments in the form of a lip. *Ovary* three-celled, hairy. *Fruit* nearly globular, with three obsolete angles, the size of a small currant.—*L.*

History.—This plant, originally from the West Indies, has been introduced into several parts of the world, in warm latitudes, where it is extensively cultivated. It has also been raised in South Carolina and Georgia. The plant is developed by planting portions of the root-stock, which gradually increases in size, and throws out leaves, which wither when the plant is mature. Arrow-root is prepared from various portions of the root when they are nearly a year old. They are washed, beaten in large deep mortars to a pulp, which is well stirred in clean water, the fibrous parts being separated by hand and thrown away. The milky liquor, which holds the starch in suspension, is passed through a fine sieve, the starch allowed to subside, the supernatant clear fluid is poured off, the starch is again washed in clean water and drained, and is then dried on sheets in the sun. This constitutes West India Arrow-root, of which the finest comes from the Bermudas. Arrow-root is likewise obtained from other plants, as the *M. Nobilis*, *M. Allouya*, *M. Indica*—(*L.*), and *Curcuma Angustifolia*, which last furnishes the East India Arrow-root. West Indian Arrow-root is a very pure variety of starch; it is in the form of a light, opaque, white powder, consisting of irregular, friable grains, varying in size from that of a millet-seed to a pea. It is inodorous, nearly tasteless, and crackles when rubbed between the fingers. Musty Arrow-root should never be purchased; though according to Prof. Procter, it may be rendered sweet and serviceable by thoroughly washing it with two portions of cold water, in succession, and then placing it in a warm apartment to dry, upon muslin frames. (*Am. Jour. Pharm.*, *XIII.*, 188.) Examined by the microscope, Arrow-root is found to consist of minute, pearly globules, or granules, which are rarely spherical or ovate, generally elliptical, sometimes of the form of a levigating muller, and of various sizes. A few attain the 750th of an inch, and many are only the 2,000th of an inch in their longest diameter; their breadth is generally two-thirds of their length.—*C.* The rings are very distinct, though fine; and the hilum is usually distinct and circular, but frequently cracked in a linear, or stellate manner. Under the polarizer, very distinct crosses are seen, the junction of the arms of the cross indicating the position of the hilum. When placed in water for a short time, small, mamillary points project from the surface.—*P.* Arrow-root presents all the chemical relations of wheat and potato starch, though it makes a firmer jelly with the same quantity of boiling water, nine parts in this respect being equivalent to fourteen of common starch. According to Prout, anhydrous Arrow-root is composed of 44.0 per cent. of carbon, 6.22 of hydrogen, and 49.78 of oxygen, or $C_{12} H_{10} O_{10}$, corresponding with the elementary composition of amylin, one of the principles of wheat starch.

West Indian Arrow-root is sometimes adulterated with wheat or potato starch, or with the East Indian variety of Arrow-root. Hydrochloric acid will determine the adulteration, as well as a microscopic examination. When potato or wheat starch is rubbed with one and a half times, or twice its weight of concentrated hydrochloric acid, a dense, transparent paste is produced, while Arrow-root thus triturated forms an opaque paste. The readiest mode of detecting these frauds is, by means of a good achromatic microscope, observing the form of their granules. The *true Arrow-root* granules have already been described above. The *East India Arrow-root* is a fine, white powder, lacking the firmness of the preceding, and producing no crackling sound on being rubbed between the fingers; its granules are flattened, ovate, or oblong-ovate, generally with a short neck or projection like a nipple. The hilum is at the small end, and is circular, small, and not very distinct; the rings are closely set and delicate. (See *Janipha Manihot* for a description of the microscopic appearance of *Tapioca.*) The *Tacca*, or *Tahiti* fecula, is a fine, white powder, frequently with a slight musty odor, and consists of circular, mullar-shaped, or polyhedral particles, the mullar-shaped grains being often narrowed at the base, and concave. The hilum is small and circular, and cracks in a linear, or stellate manner; the rings are few and indistinct. *Potato starch* granules are of various shapes and sizes, from the 250th to the 7,500th of an inch in length, the smaller grains being circular or globular, and the larger ones elliptical, oblong, ovate, or obtusely triangular. The hilum is circular, very distinct, and often double, and their surface is marked by a system of concentric rings. When they crack, this usually commences at the hilum. —*P.* (See *Canna.*)

East Indian Arrow-root is chiefly prepared from a plant growing throughout India, and particularly on the Malabar coast, the Curcuma Angustifolia; it is prepared by a process similar to that followed in the

West Indies. It is commonly white, sometimes pale-yellow, less crepitating between the fingers than the best West Indian kind, more frequently damaged by impurities, and composed of rather larger globules, unequal in size, egg-shaped, compressed, faintly rugous at their larger end, and with little processes attached to their sides. It is lighter than Maranta Arrow-root, does not so quickly make a jelly, and is of low value, being in demand only among starch-makers.

Properties and Uses.—Arrow-root is nutritive, and is used as an agreeable, non-irritating diet, in certain chronic diseases, during convalescence from fevers, in irritations of the alimentary canal, pulmonary organs, or of the urinary apparatus, and is well suited for infants to supply the place of breast-milk, or for a short time after having weaned them. It may be given in the form of jelly, variously seasoned with sugar, lemon-juice, fruit jellies, essences, or aromatics. *Potato starch* is sometimes substituted for it, but it is more apt to cause acidity. Arrow-root is superior to every other kind of farinaceous food, except tapioca and tous-les-mois. Its jelly has no peculiar taste, and is less liable to become acid in the stomach, and is generally preferred by young infants to all others, except tapioca. Tous-les-mois makes a stiffer jelly. Two or three drachms of Arrow-root may be boiled in a pint of water or milk, and seasoned as may be desired, if allowable.

MARMOR ALBUM.

White Marble.

WHITE CRYSTALLINE CARBONATE OF LIME.

History.—White Marble is known from most other minerals by its pure white color, its crystalline structure, and the effervescence it presents when touched with nitric or hydrochloric acids. It is tasteless, inodorous, friable, easily powdered, and is not dissolved by water or alcohol; but water, saturated with carbonic acid gas, dissolves $\frac{1}{1500}$th part of it; from this solution, it gradually precipitates, as the acid leaves it, in the form of a white powder. Its specific gravity is 2.717. Heat causes it to decrepitate, and as the heat is increased, the carbonic acid is driven off, leaving lime remaining. It dissolves less rapidly in acetic acid than in nitric or muriatic; it also dissolves with effervescence in sulphuric acid, and forms an insoluble salt. When pure, it consists of one equivalent of acid, or 22.12 parts, and one of lime, or 28.5 parts ($CaO+CO_2$).

It is sometimes rendered impure by the presence of magnesia. To detect this, the Marble must be dissolved in diluted hydrochloric acid, taking care that the Marble neutralizes the acid, or else the magnesia will not be thrown down on account of the formation of muriate of ammonia. To this neutral hydrochloric solution add ammonia, and if magnesia be present, it will be precipitated.

Properties and Uses.—Marble is used for several purposes in pharmacy, the principal one of which is to furnish carbonic acid gas. For pharmaceutical purposes, the purest Marble is required; but for procuring the acid gas, ordinary Marble will answer. The *Dolomitic Marble* contains more or less magnesia, and is therefore unfit for pharmaceutic use. The finest and best variety of Marble is the Carrara or Statuary Marble.

Off. Prep.—Aqua Acidi Carbonici; Potassæ Bicarbonas; Sodæ Bicarbonas.

MARRUBIUM VULGARE.

Hoarhound.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Hoarhound has a perennial fibrous root, and numerous, annual, bushy *stems*, which are erect, quadrangular, leafy, clothed with fine woolly pubescence, branching from the bottom, and from one to two feet in height. The *leaves* are roundish-ovate, crenate-dentate, rough and veiny above, woolly on the under surface, one or two inches in diameter, and supported in pairs upon long petioles; the upper ones nearly sessile. The *flowers* are small, white, in sessile, axillary, hairy, and dense whorls. The *calyx* is tubular, five to ten-nerved, nearly equal, with five or ten recurved, acute, spiny teeth, the alternate ones shorter; orifice of the tube hairy. The *corolla* is tubular, with the upper lip erect, flattish, notched; the lower spreading and trifid, the middle lobe broadest. *Stamens* four, didynamous, included beneath the upper lip of the *corolla; anthers* with divaricating, somewhat confluent lobes, all nearly of the same form. *Style* with short obtuse lobes. *Achenia* obtuse. *Seeds* four, in the base of the calyx.—*L.*—*W.*—*G.*

History.—Hoarhound is indigenous to Europe, but is naturalized in this country, where it is very common. It grows on dry, sandy fields, waste grounds, roadsides, etc., flowering from June to September. The entire plant has a white, hoary appearance. The whole herb is officinal, and should be gathered before its inflorescence. It has a peculiar, rather agreeable, vinous, balsamic odor, and a very bitter, aromatic, somewhat acrid and persistent taste. Its virtues are imparted to alcohol or water. According to Mr. McMaken, it contains a peculiar, crystallizable principle, insoluble in water, soluble in hot alcohol and in ether, less so in cold alcohol; neutral, and melting, when sufficiently heated, resin, tannic acid, volatile oil and woody fiber.—*Am. Jour. Pharm.*, *XI.*, 1.

Properties and Uses.—Hoarhound is a stimulant tonic, expectorant, and diuretic. It is used in the form of syrup, in coughs, colds, chronic catarrh, asthma, and all pulmonary affections. The warm infusion will produce diaphoresis, and sometimes diuresis, and has been used with benefit in jaundice, asthma, hoarseness, amenorrhea, and hysteria; the cold infusion is an excellent tonic in some forms of dyspepsia, acts as a vermifuge, and will be found efficacious in checking mercurial ptyalism. In large doses it purges. It enters into the composition of several syrups and candies. Dose of the powder, one drachm; of the infusion, or syrup, from two to four fluidounces.

Off. Prep.—Infusum Marrubii; Syrupus Araliæ Compositus.

MARUTA COTULA. (*Anthemis Cotula.*)

Mayweed.

Nat. Ord.—Asteraceæ (*Lindley*), or Compositæ, *Sub-tribe*, Anthemideæ.
Sex. Syst.—Syngenesia Superflua.

FLOWERS.

Description.—Maruta Cotula has an annual, twisted, tapering, fibrous *root*, with one or more *stems*, erect, branched, bushy, leafy, angular, furrowed, nearly smooth, solid, and rising from one to two feet high. *Branches* corymbose. *Leaves* alternate, sessile, bright-green, smooth, or slightly hairy, bipinnatifid and cut; the segments narrow, flat, a little succulent, spreading, and rather distant, not crowded or parallel, somewhat bristle-pointed. *Flower-heads* solitary, on terminal, striated, slightly downy peduncles. *Involucre* more or less hairy, its scales almost equal, obtuse, slightly bordered. *Disk* convex, lemon-colored, the slender, bristle-shaped, or subulate, greenish scales not quite so tall as the opening florets. *Rays* white, elliptical, three-toothed, deflexed, close to the stalk, at night. *Receptacle* highly conical, almost cylindrical, beset with slender, permanent scales. *Seeds* brown, obovate, furrowed, sometimes rough, with minute tubercles.—*L.*

History.—Mayweed is indigenous to Europe, and is very common in this country, where it is known by several other names, as *Wild Chamomile*, *Dog-fennel*, etc. It may be found growing in all waste places, in hard, dry soils, especially along roadsides. Its flowers are white, and appear from June until September. Every part of the plant is acrid and fetid, and, according to Linnæus, is grateful to toads, drives away fleas, and is annoying to flies. The whole plant is officinal. Its taste is bitter and pungent; water or alcohol extracts its properties. Mr. W. H. Warner found it to contain oxalic, valerianic, and tannic acid, coloring matter, albumen, acrid oleo-resin, insoluble bitter extractive, volatile oil, and various salts.—*Am. Jour. Pharm. XXX.*, 390.

Properties and Uses.—Tonic, emetic, antispasmodic, emmenagogue and epispastic. The cold infusion or extract may be substituted, as a tonic and antispasmodic, in all cases, for the foreign article. The extract may be used in sick headache, and in convalescence from fevers. A warm infusion may be used as an emetic or diaphoretic. It has been efficient in amenorrhea. The fresh plant bruised and applied to the skin, will cause vesication, and the sores heal readily. A powerful epispastic is made by bruising the fresh leaves of *M. Cotula* and *Polygonum Punctatum*, equal parts, and moistening them with a small quantity of spirits of turpentine. Dose of the infusion, from one to four fluidounces, as often as required.

Off. Prep.—Infusum Anthemidis Cotulæ.

MEL.

Honey.

A SACCHARINE JUICE DEPOSITED BY APIS MELLIFICA.

History.—The *Apis Mellifica*, or Honey bee, belongs to the order *Hymenoptera* of the class of insects. In the wild state it dwells in the hollows of trees in large communities, consisting of males, females, and neuters. Honey is a saccharine matter secreted by the nectariferous glands of flowers, which is collected by the working bees, and deposited in their *crop* or *Honey-bag*, from which it is ejected when the insect reaches its hive. The taste and odor of Honey varies according to the age of the bees, and the character of the flowers from which it is gathered. There is no doubt but the secretions of the crop of the insect, somewhat alter the properties of the Honey received into it from the nectaries. *Virgin Honey* is the best kind, and is procured by dripping Honey-comb from a hive of young bees before they have swarmed. Honey of a superior quality is obtained by allowing it to ooze from the Honey-comb. After the first Honey is thus procured, by subjecting the Honey-comb to compression a poorer variety may be expressed; or it may be obtained by fusion in the vapor-bath. Although a large amount of Honey is supplied in our own country, yet the greater part of that used in our maritime towns and cities is imported from some of the West Indian islands.

At first Honey is fluid, thick, viscid, colorless, or of the palest straw tint, of a peculiar fragrant odor, and of a corresponding, very sweet taste; when long kept it becomes concrete from the formation of numerous granular crystals. Its flavor and quality vary, according to the character of the flowers to which the bees have access. Its density, according to Duncan, is 1.33. In a great measure it is soluble in water, and not so readily soluble in alcohol; alcohol at 212° F. dissolves it, but on cooling deposits crystals of grape sugar. M. Souberain states that there are three different kinds of sugar in Honey, one, a granular sugar, or glucose, the second, a sugar possessing the power of rotation to the right, and which is capable of having this power changed by acids, and the third, a sugar which rotates to the left, but with nearly double the energy of that which has been changed by acids. The first of these two latter sugars abound in the liquid Honey of the comb, so much so that a solution which rotates $+ 0.96°$ to the right, acquires by the action of acids, the power of rotating in an opposite direction to the left, to the extent of 13.78°; after Honey has been kept for some time this sugar disappears. The second of the two latter sugars is a liquid sugar, and is nearly identical with cane sugar, which has been acted upon by acids, it is non-crystallizable, very easily decomposed by alkalies, and may be converted into a transparent, solid, and easily fusible state, like barley sugar. But it can not be converted into granular sugar, and has nearly double the rotating power of ordinary uncrystallizable sugar.—*Chemical Times.*

In addition to these sugars, Honey has been found to contain odorous, coloring, gummy, and waxy matters. According to Turner, when Honey is diluted with water, it is susceptible of the vinous fermentation, without the addition of yeast; if yeast be added it forms the alcoholic liquor called *mead;* if nitric acid be allowed to act on Honey, oxalic acid is the result. The poorer sorts of Honey contain an acid, and considerable sugar which is not crystallizable. Honey is occasionally adulterated with flour or starch, especially the inferior kinds, in order to give them a white appearance; these adulterations may be distinguished by their insolubility in cold water, and by the blue color produced when iodine is added to them. If the Honey be thin, and slow to crystallize, it has been adulterated with water. Unless it be quite pure, Honey is apt to undergo ermentation in warm seasons, becoming more acrid and darker colored.

Mel despumatum or clarified Honey is generally obtained from the inferior qualities; the process of clarification is entirely unnecessary with fine Honey. It may be purified by melting the Honey by means of a water-bath, removing the substances which float upon the surface by means of a skimmer, and decanting the Honey from the deposit formed at the bottom of the vessel containing it. The French are said to clarify Honey as follows: They mix together 500 parts of Honey, 125 parts of water, and 16 parts of pulverized carbonate of lime, well washed; this mixture, being stirred all the time, is boiled for three or four minutes, after which 16 parts of washed animal charcoal (which has been subjected to a red heat and then pulverized) are added, and the mixture again boiled for three or four minutes. Then about 83 parts of a mixture of the white of one egg well beaten, with 250 parts of water, are added, and the whole brought to the temperature of 212° F. When nearly cool, the liquid is passed repeatedly through flannel strainers until it is transparent; then, if it be too thin, it is reduced to the proper consistence, by rapid boiling. A. Hoffman recommends the following process for purifying Honey, the gelatine being added, because it is sometimes deficient in Honey, and then the tannic acid can not purify it: Dissolve twenty-eight pounds of Honey in twice its weight of water, and heat to the boiling point, then add a solution of three drachms of gelatine dissolved in three times its weight of water, and lastly add a solution of one drachm of tannic acid in water. The mixture must be well stirred, and kept hot for about an hour. About seven-eighths of the Honey may be drawn off clear, the remainder is filtered through flannel, and the clear solution evaporated.

Properties and Uses.—Honey is nutritious, antiseptic, diuretic, and demulcent. Used in urinary affections, and as an addition to gargles, lotions, injections, etc. It is said that the Indians make an infusion of the Honey bee, and give a gill of it every half hour, in strangury, suppression of urine, etc.; and it is further added, that this infusion has the power of destroying the sexual propensity. A very excellent preparation for coughs, especially during febrile or inflammatory attacks, is composed of Honey, olive oil, lemon-juice, and sweet spirits of nitre, of each, one fluidounce; to be taken several times a day, in half fluidrachm or fluidrachm doses. A tincture of Honey bees is made by collecting a quantity of the living insects in a vial, agitating them roughly so as to irritate them, and while in that condition they are to be covered with alcohol; in a few days it will be ready for use. In doses of five, ten, or fifteen drops, three or four times a day, this is highly recommended in many diseases of the bladder and kidneys, as well as in some uterine affections. Some practitioners assert that it will produce abortion in the pregnant female, if its use be too long continued, or when employed too freely.

Off. Prep.—Pilulæ Ferri Carbonatis; Tinctura Opii Camphorata; Unguentum Plumbi Compositum.

MELIA AZEDARACH.

Pride of China.

Nat. Ord.—Meliaceæ. *Sex. Syst.*—Decandria Monogynia.

THE BARK OF THE ROOT.

Description.—This is an elegant tree, also known by the names *Bead-tree*, *Pride of India*, etc.; it attains the height of thirty or forty feet, with a trunk about a foot and a half in diameter, and divaricate branches. Bark rough. The *leaves* are alternate, unequally bipinnate; *leaflets* opposite, ovate, acute, serrated, sometimes incised, in pairs with an odd one. *Flowers* in terminal panicles, lilac-colored, on axillary peduncles. The *corolla* consists of five petals, patent, pale pink inside, deep lilac outside; *calyx* five-parted. *Stamens* with tube ten-cleft at top, deep violet; *anthers* yellow. *Ovary* five-celled; *stigma* five-lobed; *style* columnar. *Fruit* a drupe the size of a small olive, with one five-celled bony nut; *cells* one-seeded.—*L.*

History.—This tree although a native of several Asiatic countries, is cultivated in the warm climates of Europe and America; it does not grow to any extent north of Virginia, and flowers early during the spring. Its name of *Bead-tree* was derived from the use to which its hard nuts are put in Roman Catholic countries, viz., for making rosaries. The recent bark of the root is the most active part for medicinal purposes, it has a disagreeably bitter taste, and a very unpleasant odor, and imparts its properties to water at 212° F. A fluid extract, might possibly be prepared from it, for general use.

Properties and Uses.—The bark is anthelmintic, and in large doses, narcotic and emetic. Kollock states that if gathered in the spring of the year, during the ascent of the sap, it will cause narcotic symptoms resembling those occasioned sometimes by spigelia. It is useful in worm fevers, and in those infantile remittents, in which, although, worms are absent, yet the symptoms are similar to those accompanying the presence of worms. Dose of the powdered bark, twenty grains: of the decoction (which is the best form for administration—two ounces of the bark to a pint of water, and boiled down to half a pint) a tablespoonful every one, two, or three hours, till the desired effect obtains; a purgative should follow its employment. The fruit is somewhat saccharine, and is said to be an active anthelmintic; its pulp has been used in an ointment for destroying lice and other ectozoa, as well as in the treatment of scald-head, and other diseases of the skin. By expressing the nuts an oil may be obtained which is said to possess anthelmintic properties, and to be useful as a local application to rheumatic affections, cramps, obstinate ulcers, etc.

MELISSA OFFICINALIS.

Balm.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Balm is a perennial herb, with upright, branching, four-sided *stems*, from ten to twenty inches high. The *leaves* are opposite, broadly ovate, acute, coarsely crenate-serrate, rugose, petioled, more or less hairy. The *flowers* are pale yellow, in axillary dimidiate verticils, subsessile; *bracts* few, ovate-lanceolate, petiolate. *Calyx* slightly gibbous at base, thirteen ribbed, flattish above, upper lip three toothed, lower one bifid. *Corolla* with a recurved-ascending tube; upper lip erect, flattish, lower lip spreading, three-lobed, the middle lobe mostly broadest. *Stamens* ascending.—*W.*—*G.*

History.—Balm is a native of Southern France, but is naturalized in various parts of Europe and the United States. It grows in fields, along roadsides, and is well known as a garden plant, flowering from May to August. The whole plant is officinal, and should be collected previous to its flowering. In the recent state, it has a lemon-like odor, which is nearly lost by drying; its taste is aromatic, and faintly astringent, with a degree of persistent bitterness. Boiling water extracts its virtues. Balm contains a bitter extractive substance, a little tannin, gum, and a peculiar volatile oil. A pound of the plant yields about four grains of the oil, which is yellowish, or reddish-yellow, very liquid, 975 in density, and possessing the fragrance of the plant in a very high degree. The infusion of balm is *incompatible* with nitrate of silver, acetate of lead, and sulphate of iron. The *Nepeta Citriodora*, a powerful emmenagogue, is sometimes cultivated and employed by mistake for Balm. It has the same odor, but may be distinguished by having both surfaces of its leaves hairy.

Properties and Uses.—Balm is moderately stimulant, diaphoretic, and antispasmodic. A warm infusion drank freely, has been serviceable as a diaphoretic in febrile diseases, and painful menstruation, and to assist the operation of other diaphoretic medicines; in combination with ipecacuanha and nitre, it forms a valuable diaphoretic. It is also occasionally used to assist menstruation. When given in fevers, it may be rendered more agreeable by the addition of lemon-juice. The infusion may be taken ad libitum.

Off. Prep.—Infusum Melissæ.

MENISPERMUM CANADENSE.

Yellow Parilla.

Nat. Ord.—Menispermaceæ. *Sex. Syst.*—Diœcia Polyandria.

THE ROOT.

Description.—This plant is also known by the names of *Sarsaparilla*, *Moonseed*, *Vine-maple*, etc.; it has a perennial, horizontal, woody, very long *root*, of a beautiful yellow color externally, and a round, striate, climbing *stem*, greenish-yellow when young, and from eight to twelve feet in length. The *leaves* are roundish, cordate, peltate, three to seven-angled or lobed, smooth, the petiole inserted near the base and from three to five inches long, and white lines radiating from the petiole on the upper surface to each angle, glaucous green above, paler below, entire, and four or five inches in diameter. The *flowers*, are small, yellow, and disposed in axillary clusters; *sepals* four to eight, in a double row; *petals* four to seven, minute, retuse, shorter than the sepals. *Stamens* twelve to twenty in the sterile flowers; *anthers* four-celled. *Pistils* two to four in the fertile flowers, raised on a short stalk, one or two ripening into round drupes. Imperfect stamens are sometimes found in the fertile flowers. *Drupes* about four lines in diameter, black with a bloom resembling frost-grapes, one-seeded. *Seeds* crescent, compressed.—*W.*—*G.*

History.—This is a valuable American remedy, not yet in extensive use among physicians. It grows in woods and hedges near streams, from Canada to Carolina and west to the Mississippi, flowering in July. The root is the officinal part, it has a bitter, persistent, but not unpleasant acrid taste, and yields its virtues to water or alcohol. It has not been analyzed. The root of this plant has been offered in our markets as a Texas Sarsaparilla.—*See Am. Jour. Pharm. Vol. XXVII.*, 7.

Properties and Uses.—Yellow Parilla is tonic, laxative, alterative and diuretic. In small doses, no obvious effects are produced on the general system; but in larger doses, a slight increase of the volume of the pulse may be perceived, as well as an increase of the appetite, and the action of the bowels. In excessive doses, purging and vomiting will follow, but no other unpleasant effect. It is a superior laxative bitter. It is much esteemed as a remedy in scrofulous, cutaneous, arthritic, rheumatic, syphilitic, and mercurial diseases. Said to be superior to the imported Sarsaparilla. Likewise employed in dyspepsia, general debility, and chronic inflammation of the viscera. Externally, the decoction has been used with good effect as an embrocation in gouty and cutaneous affections. Dose of the decoction, from one to four fluidounces three times a day; of the extract, from two to six grains three or four times a day; of the saturated tincture, from half a fluidrachm to a fluidrachm.

A so-called chemical Institute of the City of New York, advertise the active principle of this root, under the name of *Menisperine;* it is stated to be a powder of a whitish-brown color, with a not unpleasant, bitter taste, and is recommended as an alterative, tonic, nervine and laxative. Said to be valuable in the treatment of scrofulous, cutaneous, syphilitic, and mercurial diseases, and superior to sarsaparilla as an alterative. Dose from one to three grains, three or four times a day. I have not been made acquainted with the process of manufacture, nor do I even know whether it is a secret preparation; but I have no doubt, from the known virtues of Yellow Parilla root as an alterative, that if its active principle can be obtained, it will prove a decidedly valuable medicine.

Off. Prep.—Decoctum Menispermi; Syrupus Rumicis Compositus.

MENTHA PIPERITA.

Peppermint.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—This herb is a perennial, with procumbent, ascending, branched, reddish *stems*, quite smooth, or fringed with a few spreading hairs, furrowed and quadrangular, and two or three feet in height. The *leaves* are ovate-oblong, or somewhat lanceolate, rounded at the base, deep green, smooth or hairy on the under side, serrate, on ciliated petioles. The *flowers* are in whorls small and purplish; *upper floral leaves* small, lanceolate-subulate, shorter than the flowers. *Whorls* few, lax, the uppermost collected into a short, oblong, obtuse, reddish spike; the lowermost remote, with the cymes shortly stalked. *Bracts* subulate, the outer ones as long as the calyx. *Pedicels* quite smooth. *Calyx* five-toothed, teeth hispid, subulate, erect. *Corolla* four-cleft, tubular, the broadest segment emarginate. *Stamens* four, awl-shaped, straight, distant; *anthers* with two parallel cells. *Achenia* smooth.—*L.*—*W.*—*G.*

History.—Peppermint is indigenous to England, and has been extensively cultivated in various parts of Europe, and throughout the United States. It grows wild in damp places, and flowers from July to September. In order to preserve the fragrance of this plant, the roots require to be re-set triennially. The entire herb is officinal; it should be collected as soon as the flowers begin to develop themselves, and be carefully dried in the shade. The whole plant has a peculiar, aromatic, diffusive odor, and an agreeable, warm, burning, bitter taste, followed by a feeling of coolness during inspiration. These properties are more marked in the fresh than in the dried plant. Both the odor and taste are retained when the plant is dried, and may be preserved for a long time. Its virtues are owing to a volatile oil, which is contained in little vesicles existing throughout the plant, and visible in the leaves; and which may be obtained by distillation with water. It also contains a portion of tannic acid, as its infusion becomes dark-green with the salts of sesquioxide of iron. Its virtues are taken up in infusion by water, and still better by alcohol.

Properties and Uses.—Peppermint is a powerful, diffusive stimulant, antispasmodic, carminative, and stomachic. Used in the treatment of gastrodynia, flatulent colic, hysteria, spasms or cramps of the stomach, to allay the griping of cathartics, to check nausea and vomiting, and to disguise the unpleasant taste of other medicines. The fresh herb bruised, and applied over the bowels, will often allay sick stomach, and is efficacious in cholera infantum. The infusion may be drank freely; but the most usual form of administration is the *essence*, made by dissolving one fluidrachm of the oil in one fluidounce of alcohol. Dose, from ten to sixty drops in sweetened water.

Off. Prep.—Aqua Menthæ Piperitæ; Extractum Rhei Fluidum; Infusum Menthæ Piperitæ; Mistura Camphoræ Composita; Mistura Cajuputi Composita; Oleum Menthæ Piperitæ; Pulvis Rhei Compositus; Tinctura Olei Menthæ Piperitæ.

MENTHA VIRIDIS.

Spearmint.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Spearmint is a creeping-rooted herbaceous plant, with erect, branching, quadrangular, smooth *stems*, one or two feet high. The *leaves* are subsessile, ovate-lanceolate, unequally serrated, smooth; those under the flowers all bract-like, rather longer than the whorls; these last and the calyxes hairy or smooth. *Flowers* pale purple. *Spikes* cylindrical, loose. *Whorls* approximated, or the lowest or all of them distant; *peduncles* smooth, round, shining. *Calyx* bell-shaped, five-toothed. *Corolla* funnel-shaped.—*L.*—*W.*

History.—Spearmint is a European herb, but like the preceding species of mint, is extensively cultivated in various moist places in this country on account of its oil, and for domestic use. It flowers in July and August; the whole herb is officinal, and should be gathered for medical use, during dry weather, and previous to the full development of the flowers. If gathered to procure its oil, it should be done after the flowers have become developed, and before the ripening of the seeds. It has a strong, peculiar, aromatic odor, and an aromatic, faintly bitter taste, followed by coolness in the mouth during inspiration. When the plant is carefully dried, these properties are preserved for a long time. Its virtues are owing to a volatile oil, which may be obtained by distillation with water. Alcohol extracts its virtues, also water by infusion.

Properties and Uses.—The carminative, antispasmodic, and stimulant properties of Spearmint are somewhat inferior to those of peppermint; its principal employment is for its diuretic and febrifuge virtues. As a febrifuge, it is superior to peppermint, and may be used freely in warm infusion. The cold infusion is beneficial in high color or scalding of urine, difficult micturition, etc.; it may be used alone, or in combination with marsh-mallow root. A saturated tincture of the fresh herb with gin has been found serviceable in gonorrhea, strangury, suppressed urine, gravel, and as a local application to painful hemorrhoids. The oil is diuretic, stimulant, antispasmodic, and rubefacient, and is used externally in rheumatic and other pains. Dose, same as peppermint.

Off. Prep.—Aquæ Menthæ Viridis; Infusum Menthæ Viridis; Mistura Camphoræ Composita; Pilulæ Taraxaci Compositæ: Pilulæ Saponi Compositæ; Tinctura Menthæ Viridis; Tinctura Olei Menthæ Viridis.

MENYANTHES TRIFOLIATA.

Buckbean.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND ROOT.

Description.—This plant is also known by the names of *Bog-bean*, *Marsh-trefoil*, *Water-shamrock*, etc.; it is a perennial, and has a blackish rhizoma, about five or six lines in diameter, and penetrating horizontally in the earth to a great distance, regularly intersected with joints at the distance of about half an inch from each other; these joints are formed by the breaking off of the old petioles and their sheaths. The *leaves* proceed from the end of the rhizoma on long stalks furnished with broad sheathing stipules at base; they are trifoliate, nearly oval, glabrous, somewhat fleshy, and slightly repand, or furnished with many irregularities at the edge, which hardly prevent them from being entire. *Scape* round, ascending, smooth, about a foot high, bearing a conical raceme of flowers. *Peduncles* straight, supported by ovate, concave bracts. *Calyx* erect, somewhat campanulate, five-parted, persistent. *Corolla* white; its tube short, border five-cleft, spreading, and at length revolute, clothed on the upper part with a coating of dense, fleshy, obtuse hairs. *Stamens* five, shorter than the corolla, and alternate with its segments; *anthers* oblong, arrow-shaped. *Ovary* ovate; *stigma* bifid, compressed. *Capsule* ovate, two-valved, one-celled; *seeds* numerous, minute.—*L.* Its flowers are flesh color or pale lilac.

History.—Buckbean is indigenous to this country and Europe, growing in spongy, boggy soils, swamps, ditches, etc., flowering from April to August. The whole plant possesses medicinal properties, but the root and leaves are the parts more generally employed. The whole plant is nearly odorless, but has a very bitter, somewhat aromatic taste. Water, or alcohol takes up its active properties. It contains albumen, chlorophyll, a peculiar substance precipitable by tannin, but soluble in water, fecula, malic acid, bitter extractive, etc. It contains a principle, probably the one on which its properties depend, called *menyanthin.* It may be procured by making an alcoholic extract of the leaves and root, adding hydrated oxide of lead to this, passing sulphureted hydrogen to precipitate the lead, filtering the liquor, evaporating to dryness, dissolving the residue in alcohol, again filtering, and evaporating with a moderate heat. Thus obtained it is not perfectly pure, but may be employed in medicine; it is neutral, bitter, insoluble in ether, but soluble in water or alcohol.

Properties and Uses.—Buckbean, when recent and given in large doses, usually causes emesis. It is, when dried, tonic and astringent, or purgative, according to the dose. It has been given in dyspepsia, intermittent and remittent fevers with advantage; and has been highly recommended in chronic rheumatism, hepatalgia, dropsy, worms, and some cutaneous diseases, and as a tonic in scrofula, and various cachectic affections. As a tonic, the powdered root or herb may be given in doses of from ten to twenty-five grains; of the aqueous extract, five or ten grains; of the infusion (made by infusing two drachms of the herb or root in four fluidounces of water at 212° F.), a fluidounce or two; repeating the dose of either every three or four hours. Sixty grains of the powder, or four fluidounces of the infusion, produce catharsis, and sometimes emesis.

MITCHELLA REPENS.

Partridgeberry.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE VINE.

Description.—This is an indigenous evergreen herb, with a perennial root, from which arises a smooth and creeping *stem*, furnished with roundish-ovate, or slightly heart-shaped, petiolate, opposite, flat, coriaceous, dark-green, and shining *leaves*, usually variegated with whitish lines. The *flowers* are white, often tinged with red, very fragrant, in pairs, with their ovaries united. *Calyx* four-parted. *Corolla* funnel-form, two on each double ovary, limb four-parted, spreading, densely hairy within. *Stamens* four, short, inserted on the *corolla*. *Style* slender; *stigmas* four. *Fruit* a dry berry-like, double drupe, crowned with the calyx-teeth of the two flowers, each containing four small and seed-like bony nutlets. Some plants bear flowers with exserted stamens and included styles; others, conversely, those with included stamens and exserted styles.—*W.*—*G.*—*T.*

History.—This plant is indigenous to the United States, growing in dry woods, among hemlock-timber, and in swampy places, flowering in June and July. The leaves bear some resemblance to clover, and remain green through the winter. The fruit or berry is bright scarlet, edible, but nearly tasteless, dry and full of stony seeds, and also remains through the winter. The plant is sometimes called *Checkerberry*, *Winter-clover*, *Deer-berry*, *Squaw-vine*, *One-berry*, etc. The whole plant is officinal, and imparts its virtues to boiling water or alcohol. It has not been analyzed.

Properties and Uses.—Partridge-berry is parturient, diuretic, and astringent. Used in dropsy, suppression of urine; and diarrhea, in decoction. It seems to have an especial affinity for the uterus, and is highly beneficial in all uterine diseases. It is said that the squaws drink a decoction of this plant for several weeks previous to their confinement, for the purpose of rendering parturition safe and easy. It appears to exert a powerful tonic and alterative influence on the uterus. The remedy is peculiarly American, not being noticed or used by foreign practitioners. Dose of a strong decoction, from two to four fluidounces, two or three times a day. The berries are a popular remedy for diarrhea, and dysury. Used as follows, partridge-berry is highly recommended as a cure for sore nipples: Take two ounces of the herb, fresh if possible, and make a strong decoction with a pint of water, then strain, and add as much good cream as there is liquid of the decoction. Boil the whole down to the consistence of a soft salve, and when cool, anoint the nipple with it every time the child is removed from the breast.

Off. Prep.—Extractum Mitchellæ; Syrupus Mitchellæ Compositus.

MOMORDICA ELATERIUM.

Wild Cucumber.

Nat. Ord.—Cucurbitaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE FECULENCE OF THE JUICE OF THE FRUIT. ELATERIUM.

Description.—*The Wild*, or *Squirting Cucumber*, sometimes called *Wild Balsam-apple*, is a hispid, scabrous, and glaucous plant. The *stems* are several from the same root, cylindrical, prostrate, without tendrils. *Leaves* cordate, somewhat lobed, crenate-toothed, very rugose, on long stalks. *Flowers* monœcious, yellow. *Male flowers: corolla* five-parted; *calyx* five-cleft, with a short tube; *stamens* triadelphous, with yellow, connate anthers. *Female flowers: filaments* three, sterile; *style* trifid; *ovary* three-celled. *Fruit* oblong, obtuse at each end, hispid, disarticulating from its stalk with violence, and expelling its seeds and mucus with considerable force, in consequence of the sudden contraction of the sides. *Seeds* black, compressed, reticulated.—*L.*

History.—The Wild Cucumber is the *Ecbalium Elaterium* of some botanists; it is indigenous to the South of Europe, growing on poor soils, in waste places, and flowering in July. It has been extensively cultivated in England for medicinal purposes, where, however, it dies in the winter. It could be cultivated in this country, as it thrives well, requiring but little attention. The officinal part of the plant is the juice around the seeds, and which, when properly prepared, forms the *Elaterium* of commerce. It must be collected a little before the period of ripening. Dr. Clutterbuck's process is as follows: "The cucumbers should be gathered when nearly as ripe as possible, and without violence that might endanger their bursting. They should then be wetted by the affusion of cold water, that less of the juice when they are cut may adhere to the external surface. In this state, they should be cut through longitudinally, and the juice allowed to strain through a fine sieve placed in a large earthenware vessel. The seeds and surrounding pulp should be scooped out upon the sieve, and washed with repeated affusions of cold water, by which they will be freed from all adhering juice. Something will be saved also by afterward rinsing the split cucumbers themselves in cold water, from which a portion of Elaterium may be collected. After standing a few hours, a sediment is formed, from which the clear liquor is to be poured off; it is then to be thinly spread on fine linen, and exposed to the air to dry; a gentle warmth may be employed without injury, but the access of sunshine destroys the fine green color which the substance otherwise acquires." One-eighth of a grain of this Elaterium purges violently; but only a small quantity of it is procured, Clutterbuck obtaining only six grains from forty cucumbers. The Elaterium of commerce probably from its manner of preparation, is much less energetic; it is obtained by powerfully compressing the fruit, and, perhaps, evaporating the juice to an extract. French Elaterium is likewise feeble in its properties. The London College directs as follows: "Slice ripe wild cucumbers, express the juice very gently, and pass it through a very fine hair sieve; then set it aside for some hours until the thicker part has subsided. Reject the thinner, supernatant part, and dry the thicker part with a gentle heat." At Apothecaries Hall the pepos are cut longitudinally, in halves, and submitted to pressure. A greenish, turbid liquor runs out upon a hair sieve, through which it passes into a glass jar. At the end of two hours a greenish deposit has taken place; the supernatant liquor is carefully decanted, and the thicker fluid at the bottom is placed on a paper filter supported by one of cloth. The residue on the filter when carefully dried by a stove, constitutes the finest Elaterium. The mother or original liquor, is placed in shallow pans, and deposits a paler Elaterium.—*P.* The London College has erroneously termed this "*Extractum Elaterii!*" The Pharmacopœias of Dublin, and of the United States more properly designate it as Elaterium. The English Elaterium is principally used in this country; and perhaps some of that which is prepared in

Malta. When in the juice of the plant, Elaterium is in a soluble condition, but after its extraction therefrom it is insoluble in water. This is due, according to Dr. A. T. Thomson, to oxidation of the juice from absorption of atmospheric oxygen; the same as many resinous principles, which become less and less perfectly soluble in alcohol, the longer they are exposed to atmospheric action.. The ordinary Elaterium of commerce consists of elaterin, resin, starch, chlorophyll, vegetable matter, saline matters, etc. Good Elaterium is in light, brittle, flat flakes, about half a line or a line in thickness, of a pale-gray color, with a slight greenish or yellowish tinge, having a feeble animal odor, and an intensely bitter taste with acrimony. It frequently has the marks upon it of the muslin or paper containing it during its desiccation. It floats upon water, forms a green tincture with alcohol, and does not effervesce in diluted hydrochloric acid. Alcohol is its best solvent. Dr. Paris found it to contain 2.8 of starch, 2.6 of extractive, 2.5 woody substance, 0.5 gluten, 1.2 elaterin, and 0.4 water. Mr. Hennell obtained 44 parts of elaterin, 17 parts green resin, 6 starch, 7 saline matters, and 26 woody fiber.—*P.* Elaterium of inferior quality is more or less curled, much darker colored, less brittle, and having a glistening fracture. It yields about six per cent of elaterin, while the best Elaterium yields from 15 to 25 per cent. The *Maltese Elaterium* is in larger flakes than the best English, is paler with hardly a trace of green, is soft and friable, or chalky to the touch, and frequently contains starch, chalk, and other impurities. It is inodorous, heavier than water, and effervesces with diluted hydrochloric acid.—*P.*

Elaterin is the principle on which the active properties of the drug depend. Morries obtained it by exhausting Elaterium thoroughly with boiling rectified spirit, concentrating the tincture so long as no separation takes place, and then pouring it while hot into a weak boiling solution of potassa. The potassa retains the chlorophyll, and the elaterin crystallizes on cooling in capillary colorless crystals.—*C.* Hennell procured it by separating the green resin (chlorophyll) from the crystalline matter of the alcoholic extract of Elaterium by ether, which took up the resin and left the elaterin; the latter was then purified by solution in hot alcohol and subsequent crystallization. When pure, elaterin is in very delicate, colorless crystals, which are striated satiny prisms, with a rhombic base. They are permanent in the air, inodorous, of a very bitter and somewhat acrid taste, neutral, insoluble in water, and weak alkaline liquids, readily soluble in rectified spirit, ether, and fixed oils, and slightly soluble in weak acids. They are fusible at 350° F. (Hennell), or at 392° F. (Phillips), and at a stronger heat are decomposed, with the evolution of white, acrid, inflammable vapors, having an odor of ammonia. Their formula is given as $C_{20}H_{14}O_5$.—(*C.—P.*)

Elaterium is seldom adulterated; its variableness of strength is owing more to the manner in which it is prepared, or the time of its collection. It should be light, pale grayish-green, and friable, not brown or compact, should not effervesce with diluted hydrochloric acid, and should yield from 15 to 25 per cent. of elaterin on analysis.

Properties and Uses.—Elaterium is an energetic hydragogue cathartic, operating with great violence in doses of a few grains, causing diffuse inflammation of the stomach and bowels, characterized by vomiting, griping pain, and profuse diarrhea. In ordinary medicinal doses it produces copious watery evacuations, attended with considerable depression of the circulation and nervous system, and most generally nausea and vomiting. Hence, it is often used in dropsy, to aid in removing the effused fluid, as a revulsive in cerebral affections, and wherever a hydragogue or revellent effect is indicated. It also augments the urinary discharge. The dose of the common commercial article is from a quarter to half a grain, administered every hour or two until it operates; of Clutterbuck's Elaterium, which is the best, and is so named because it is prepared after the process recommended by Clutterbuck, from one-eighth of a grain to one-tenth, every three or four hours; of *elaterin*, from one-sixteenth of a grain to one-eighth, and is best given in tincture. A few grains of capsicum added to each dose of Elaterium will prevent its nauseating effects. Morris recommends a tincture of elaterin made by dissolving one grain in a fluidounce of alcohol to which four drops of nitric acid have been added; the dose is from twenty to forty drops diluted with cinnamon water.

Off. Prep.—Pilulæ Gambogiæ Compositæ.

MONARDA PUNCTATA.

Horsemint.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE HERB.

Description.—Horsemint is an indigenous perennial or biennial herb, with a fibrous root. The *stems* are obtusely angled, hoary-pubescent, branched, and two or three feet high. The *leaves* are oblong-lanceolate to oblong, remotely and obscurely serrate, narrowed at base, punctate, petioled. The *flowers* are yellow with brown or purple spots, in numerous, dense, axillary whorls. *Bracts* large, yellow and red, lanceolate, obtuse at the base, sessile, longer than the whorls. *Corolla* nearly smooth, ringent, tubular, upper lips spotted with purple, lower lip reflexed, three lobed. *Calyx* elongated, cylindric, fifteen nerved, subequally five-toothed, hairy in the throat; *teeth* short, rigid, awnless. *Stamens* two, elongated, ascending, inserted in the throat of the corolla; *anthers* linear, cells divaricate at base, connate at apex.—*G.*—*W.*

History.—This plant is found growing in sandy fields and barrens from New England to the Gulf of Mexico, and westward beyond the Mississippi, flowering during the summer. The entire plant has a rather fragrant odor, and a pleasant, pungent, slightly bitter taste. It contains an abundance of essential oil, on which its active virtues depend. The oil may be obtained by distillation of the recent herb with water. The plant yields its virtues to alcohol, or boiling water by infusion.

Properties and Uses.—Horsemint is stimulant, carminative, sudorific, diuretic and anti-emetic. The infusion or essence used in flatulence, nausea, vomiting, and as a diuretic in suppression of the urine, and other urinary disorders. The warm infusion is a stimulating diaphoretic, and has acquired some celebrity as an emmenagogue; it may be drank freely. The *M. Didyma* and *M. Squarrosa* may be used as substitutes for the above.

Off. Prep.—Infusum Monardæ; Oleum Monardæ.

MONOTROPA UNIFLORA.

Iceplant.

Nat. Ord.—Ericaceæ; *Suborder*, Monotropeæ. *Sex. Syst.*—Decandria Monogynia.

THE ROOT.

Description.—This plant, also known by the names of *Ova-ova*, *Bird's Nest*, *Indian-pipe*, *Fit-plant*, etc., has a dark-colored, fibrous, perennial root, matted in masses about as large as a chestnut-burr, from which arise one or more short, ivory-white *stems*, from four to eight inches high, furnished with sessile, lanceolate, white, semi-transparent, approximate leaves or bracts, and bearing a large, white, terminal, solitary flower, which is at first nodding, but becomes upright in fruit. The *calyx* is represented by from two to four scale-like deciduous bracts, the lower rather distant from the corolla. The *corolla* is permanent, and composed of five distinct, erect, fleshy petals, which are narrowed below and have a small nectariferous pit at the base. *Stamens* ten, sometimes eight; *anthers* short on the thickened apex of the hairy filament, two-celled, opening by transverse chinks. *Stigma* five-crenate, depressed, beardless. *Pod* or *capsule* five-celled, five-valved; *seeds* numerous, invested with an arillus-like membrane.—*W.*—*G.*—*Eaton.*

History.—This is a singular plant, found in various parts of the Union from Maine to Carolina, and westward to Missouri, growing in shady, solitary woods, in rich moist soil, or soil composed of decayed wood and leaves, and near the base of trees, on whose roots it is said to be parasitic. The whole plant is ivory-white in all its parts, resembling frozen jelly, and is very succulent and tender, so much so that when handled it dissolves and melts away in the hands like ice. The flowers are inodorous, and appear from June until September; their resemblance to a pipe has given rise to the names *Indian Pipe*, or *Pipe-plant.* The root is the part used; it should be gathered in September and October, carefully dried, pulverized, and kept in well-stopped bottles.

Properties and Uses.—Iceplant-root is tonic, sedative, nervine, and antispasmodic. It has also been employed in febrile diseases, as a sedative, and diaphoretic. The powder has been employed in instances of restlessness, pains, nervous irritability, etc., as a substitute for opium, without any deleterious influences. It is reputed to have cured remittent and intermittent fevers, and to be an excellent antiperiodic. In convulsions of children, epilepsy, chorea, and other spasmodic affections, its administration has been followed with prompt success; hence its common name, *Fit* or *Convulsion-root.* The juice of the plant, alone or combined with rose-water, has been found an excellent local application to obstinate ophthalmic inflammations, to ulcers, and as an injection in gonorrhea, inflammation and ulceration of the bladder. Dose of the powdered root, from half a drachm to a drachm, two or three times a day. Dr. Stewart used it as a substitute for opium.

This plant is undoubtedly one of great value, and deserving of more confidence and attention than is at present bestowed upon it. It is not the *Mesembryanthemum Crystallinum* or Iceplant of Europe, which has a creeping stem a foot or more in length, with large, ovate, wavy, frosted leaves, and white flowers; and the whole plant is covered over with frost-like, warty protuberances, which give a very singular aspect to it.

MORUS RUBRA.

Red Mulberry.

Nat. Ord.—Urticaceæ; *Suborder*, Moreæ. *Sex. Syst.*—Monœcia Tetrandria.

THE FRUIT.

Description.—Morus Rubra, or the *Red Mulberry*, is but a shrub in the Northern and New England States, from fifteen to twenty feet high, but in the Middle and Western States it attains an elevation of from fifty to sixty feet, with a diameter of two feet, and covered with a grayish, furrowed, much broken *bark.* The *leaves* are alternate, rounded or subcordate at base, acuminate, equally serrate, either ovate or three-lobed, rough above and pubescent beneath, thick, dark-green, from four to six inches long, and about two-thirds as wide. The *flowers* are small, monœcious, rarely diœcious; the sterile ones in loose spikes; *calyx* four-parted; the fertile ones in dense spikes; *calyx* four-parted; *styles* two, filiform, stigmatic down the inside. *Ovary* two-celled, one of the cells smaller and disappearing. *Achenium* ovate, compressed, inclosed within the succulent, berry-like calyx. *Fertile spikes* cylindric, constituting a dark-red, thickened, oblong and juicy, compound *berry* or *fruit.* The *sterile spikes* are rather slender.—*W.*—*G.*

History.—The Red Mulberry is indigenous to the United States, growing in rich woods, flowering in May, and ripening its fruit in July. The wood of the tree is fine-grained, strong, and durable. The fruit is oblong-oval, of a dark-red color, and is compounded of a great number of small berries, which are very juicy, inodorous, and of an agreeable sweetish and acidulous taste; in appearance it very much resembles the fruit of the blackberry. They are said to consist of bitartrate of potassa, pectin, sugar, lignin, coloring matter and water.

Properties and Uses.—Mulberries possess very slightly nutritive qualities; they are refrigerant and laxative, and their juice forms a pleasant and grateful drink for patients suffering under febrile diseases, as it checks thirst, relieves febrile heat, and when taken freely, gently relaxes the bowels. The juice formed into a syrup and added to water, answers the same purpose, and forms a pleasant adjunct to gargles in quinsy. If the berries are eaten to excess they are apt to induce diarrhea. The bark of the tree is reputed purgative and vermifuge, having expelled tapeworm. The *Morus Nigra* of Europe possesses similar properties. The *Morus Alba*, a native of China, with white fruit which is more saccharine and less pleasant than the preceding species, is the tree upon the foliage of which the silkworm feeds.

MOSCHUS.

Musk.

History.—This article is obtained from the Moschus Moschiferus, a wild ruminating animal, rather larger than the domestic goat, and approaching the deer in its characters, and which is an inhabitant of Central Asia. At the posterior part of its abdomen, there is a small sack situated immediately under the skin, which opens a little in front of the preputial orifice, and which is filled with a thick fluid, abounding particularly in the rutting season. This fluid, in the dried state, is musk. It is removed from the animal in its containing bag, and dried in this state for exportation. The musk-bag, or pod is usually plano-convex; and in general the plain surface is a bare membrane, while the convex surface is covered with stiff hairs; but sometimes the hairy and membranous parts are reversed. It weighs, along with its contents, between five and nearly ten drachms, and contains on an average two drachms and two-thirds of musk. Musk is in the form of irregular, reddish-black, rather unctuous grains, possessing an overpowering, most penetrating, diffusive odor, and a bitterish, corresponding taste. Rectified spirit is its best solvent. Musk is now scarcely ever prescribed, both on account of its high price, and the extreme difficulty of obtaining a pure article; as nearly all the musk of the shops, at the present day, is an artificial or factitious article. Camphor, cinnamon, bitter-almond syrup, wax, etc., when mixed with musk, destroy its odor.

Musk is very inflammable, and burns with a white flame, leaving a residue of a spongy and light charcoal.—*E. & V.* With some persons, the odor of musk produces several unpleasant effects, as cephalalgia, fainting, etc. In commerce, we should always require that it be contained in its membranous bag to insure its genuineness. Boiling water, or alcohol, dissolves it in part, and ether almost completely. Its composition has been examined by several chemists. Geiger and Reinmann found it to contain a peculiar volatile substance, ammonia, a peculiar, fixed, uncrystalizable acid, stearin and olein, cholesterin with some olein and resin, peculiar bitter resin, ozmazome and salts, sand, a moldy-like substance in part combined with ammonia and salts, volatile odorous-matter, water, etc. Musk is *incompatible* with bichloride of mercury, sulphate of iron, nitrate of silver, and infusion of cinchona.

From its high price, musk is very liable to adulterations; indeed it is very rare that the pure article can be had at the shops in this country. These adulterations are very difficult to detect. Musk which is not readily inflammable, whose odor is weak, of a black or pale color, which is very damp, or gritty to the touch, may be regarded as quite worthless. By incineration, genuine musk leaves behind a grayish-white ash, whereas blood yields a reddish one. False pods may be distinguished from the genuine ones, by their ammoniacal odor, by the absence of any aperture in the middle of the hairy coat, by the hair not being arranged in a circular manner, and by the absence of the remains of the penis, which accompanies every genuine musk-sac.

Properties and Uses.—Musk is a stimulant to the nervous and vascular system, and an irritant to the stomach, deranging its functions; also said to possess narcotic properties secondarily. From its influence on the nervous system it is termed a powerful antispasmodic; and has been used with advantage in typhus and low forms of fever, obstinate hiccough, pertussis, epilepsy, chorea, hysteria, asthma, palpitation of the heart, colic, convulsions of infants, all spasmodic affections, etc. United with ammonia it has been used with success in stopping the progress of gangrene. Fifteen grains of Musk, combined with extract of valerian, and alcoholic extract of cimicifuga, of each fifteen grains, and divided into fifteen pills, will be found beneficial in pneumonia accompanied by delirium, and in the involuntary movements observed in low typhoid fevers. One pill may be given every hour or two, until there is a marked improvement in the symptoms. In small doses Musk is hypnotic. If its use is long-continued it imparts its peculiar odor to the secretions. It should always be given in substance, either in the form of pills or emulsion. Dose from five to twenty grains, every two or three hours. Nitre, cochineal, of each two grains, Musk one grain, mix, and form a powder. This powder, given and repeated every two or three hours, is said to be very useful in some low forms of fever, and in febrile or inflammatory affections with spasmodic action or delirium. An *artificial Musk* is prepared, by carefully adding, drop by drop, three parts of fuming nitric acid to one of unrectified oil of amber. The acid is decomposed, and the oil converted into an acid resin, which must be kneaded under pure water, until all excess of acid is removed. The substance which remains is of a yellowish-brown color, viscid, and an odor similar to musk, for which it may be used as a substitute in doses of from fifteen to thirty grains. A tincture of Musk is made by macerating one part of Musk in four parts of alcohol (or ether). The dose is from twenty to forty minims. M. Hannon, on account of the high price of Musk, and its liability to adulteration, has sought for a vegetable substitute, which he thinks he has found in a Columbian plant, cultivated in Belgium, the *Mimulus Moschatus*, which plant yields an essential oil by distillation. In doses of two or three drops, this oil exerts an energetic excitant action on the intestinal canal, and on the brain. In a state of health it caused vertigo, cephalalgia, dryness in the fauces, epigastric weight, and eructations. He believes it may replace the animal Musk, and may be given in hysteria, and analogous complaints, in doses of from two to four drops in the twenty-four hours. He calls it *Vegetable Musk*.

MUCUNA PRURIENS.

Cowhage.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE HAIRS FROM THE PODS.

Description.—This is a perennial plant, with a fibrous *root*, and a twining, herbaceous, much-branched *stem*, of considerable length. The *leaves* are alternate, pinnately trifoliate, distant, and on long petioles; the *leaflets* are entire, ovate, acute, smooth above, hairy beneath; the lateral ones oblique at the base, the middle one slightly rhomboidal. The *flowers* are rather large, have a disagreeable alliaceous odor, and are disposed in axillary, lax, many-flowered, interrupted racemes, from a foot to a foot and a half long. The *corolla* is papilionaceous; *vexillum* cordate, incumbent on the wings, much shorter than them and the keel, without callosities, flesh-colored; *wings* oblong-linear; connivent, purple or violet; *keel* or *carina* straight below, slightly falcate in the upper part, terminated by a smooth polished, acute beak, greenish-white. *Stamens* diadelphous (9 and 1) alternately longer; *anthers* alternately longer and ovate. *Calyx* campanulate, bilabiate, with two very caducous bracteoles as long as the tube, hairy, pink, bilabiate with narrow lanceolate segments; upper lip broad, entire or emarginate; lower, trifid, the middle segment the largest. *Style* long and slender, hairy below; *stigma* small. *Legume* about three inches long, as thick as the finger, closely covered with strong, brown, stinging hairs. *Seeds* oblong, variegated, with a white hilum.—*L.*

History.—This plant inhabits the West Indies, and other tropical parts of South America; it is found in woods, along river courses, upon fences, and in waste, neglected places. The East India species, *Mucuna Prurita*, is entirely distinct from the one under consideration. The officinal part of the plant is the hair of the pods, which are generally imported into this country attached to the pod, and from which they are carefully removed, so that they do not fasten to the operator's hands.

Properties and Uses.—Cowhage is a mechanical anthelmintic, acting by irritating the body of the worms; its decoction, or tincture has no anthelmintic properties. It is used in the treatment of intestinal worms, which are expelled alive. It has no effect on tenia, but appears more serviceable in removing the lumbrici and ascarides. Dose, from one drachm to half an ounce in syrup or molasses, and followed, a few hours afterward, by a purgative. The application of oil is the best to allay the heat and itching it produces when rubbed on the skin. Cowhage has been recommended in the form of an ointment, as a cutaneous irritant, in the place of croton oil, and tartar-emetic, also as a good medium for the endermic application of various substances, as muriate of morphia. The proportions are, seven grains and a half of the hairs of Cowhage to an ounce of lard. This must be rubbed in from ten to twenty minutes; seven or eight grains are usually sufficient. The immediate effect is the production of a sensation resembling stinging with nettles; but the burning sensation and the itching diminish during the friction, and entirely pass off in less than half an hour. The skin generally becomes covered with white, flat papulæ, which soon disappear, leaving a sensation of heat. It produces no inconvenience, and children bear it easily.

MYRICA CERIFERA.

Bayberry.

Nat. Ord.—Myricaceæ. *Sex. Syst.*—Diœcia Tetrandria.

THE BARK AND WAX. BAYBERRY WAX.

Description.—This plant, known also by the names of *Wax Myrtle*, *Waxberry*, etc., is a branching, half-evergreen shrub, from one to twelve feet in height, and covered with a grayish bark. The *leaves* are glabrous, cuneate-lanceolate, rather acute or obtuse, distinctly petiolate, margin entire, but more frequently remotely dentate, particularly toward the end, paler and with distinct veinlets beneath, generally twisted or revolute in their mode of growth, shining and resinous, dotted on both sides, and from an inch and a half to two and a half inches in length, by half an inch to three-quarters wide. The *flowers* appear in May, before the leaves are fully expanded. The *males* grow in aments, which are sessile, erect, from six to nine lines in length; originating from the sides of the last year's twigs. Every flower is formed by a concave rhomboidal scale, containing three or four pairs of roundish anthers on a branched footstalk. The *females*, which are on a different shrub, are less than half the size of the males, and consist of narrower scales, with each an ovate ovary, and two filiform styles. To these aments succeed clusters or aggregations of small globular *fruits*, resembling berries, which are at first green, but finally become nearly white. They consist of a hard stone, inclosing a dicotyledonous kernel. The stone is studded on its outside with small, black grains, resembling fine gunpowder, over which is a crust of dry, greenish-white wax, fitted to the grains, and giving the surface of the fruit a granulated appearance. The *fruit* is persistent for two or three years.—*L.*—*P.*—*W.*—*G.*

History.—This plant is found in dry woods or in open fields, from Canada to Florida. The bark of the root is the officinal part; boiling water extracts its astringent principles, and alcohol its stimulating. It probably contains tannin, gallic acid, extractive matter, and lignin. The root should be collected late in the fall, cleansed from dirt and foreign substances, and then while fresh, pounded with a hammer or club to separate the bark, which should be thoroughly dried without exposure to a wet or moist atmosphere, then pulverized, and kept in darkened and well-closed vessels. The wax is removed from the berries by boiling them in water, upon the top of which it floats, and from which it is removed when it has become cold and hardened; it is a concrete oil or fatty substance, of a pale-green color, with a tendency to dirty gray, of moderate hardness and consistence, having the tenacity of beeswax, but more brittle and not so unctuous to the touch, of a faintly balsamic and pleasant odor, which is increased by burning it, and of an astringent, bitterish taste. It fuses at a temperature of 109° F., burns with a clear, white flame, producing little smoke, and has the specific gravity 1.0150. Water does not act upon it; boiling alcohol dissolves one-twentieth of its weight, but deposits it again upon cooling; hot ether dissolves about one-fourth of its weight, and on cooling deposits it in crystalline plates like spermaceti; the ether becomes green, leaving the wax nearly white; oil of turpentine, aided by heat, dissolves it sparingly; alkalies and acids act upon it nearly as upon beeswax. Sulphuric acid, assisted by heat, dissolves about one-twelfth of its weight, and converts it into a thick, dark-brown mass. A bushel of Bayberries will yield about four pounds of the wax, which by saponification yields stearic, margaric, and oleic acids, and glycerin; its formula is $C_{36}\,O_{36}\,H_{5}$.

Properties and Uses.—Bayberry Bark is astringent and stimulant, and in drachm doses, it is apt to occasion emesis. The bark has been successfully employed in scrofula, jaundice, diarrhea, dysentery, and other diseases where astringent stimulants were indicated. The powdered bark, combined with bloodroot, forms an excellent application to indolent ulcers, and has likewise been employed as a snuff for the cure of some forms of nasal polypus. In the form of poultice, with elm, or alone, it is a valuable application to scrofulous tumors or ulcers. The decoction is beneficial as a gargle in sore mouth and throat, and is of service in injection, in leucorrhea and fistula, and also as a wash for ulcers, tinea-capitis, etc. It also forms an excellent gum wash, for tender, spongy, and bleeding gums. The leaves are reputed astringent, and useful in scurvy and spasmodic affections. Probably the *M. Pennsylvanica*, *M. Carolinensis*, and *M. Gale*, possess similar properties. Bayberry wax has been used by Dr. Fahnestock in epidemic dysentery with typhoid symptoms, with considerable success; it possesses mild astringent properties with some narcotic. It is also used in the form of plaster, as an application to scrofulous and other ulcers. Dose of the powdered bark, from twenty to thirty grains; of the wax, one drachm; of the decoction of the leaves or bark, from two to four fluidounces.

Off. Prep.—Cataplasma Myricæ; Decoctum Myricæ; Extractum Myricæ; Emplastrum Myricæ; Lotio Lobeliæ Composita; Pulvis Asclepiæ Compositus; Pulvis Myricæ Compositus; Unguentum Myricæ.

MYRICIN.

Myricin.

DRIED ALCOHOLIC EXTRACT OF BAYBERRY BARK.

Preparation.—I am indebted to Drs. Hill & Co., of this city, for a description of the mode of preparing this article. Make a saturated tincture of Bayberry Bark, filter, distill off a portion of the alcohol, evaporate the remainder by means of a water-bath until the mass is of a syrupy or semifluid consistence, then spread it in thin layers on glass or metallic plates, and allow it to dry by spontaneous evaporation, which will require several weeks.

Some manufacturers precipitate the Myricin from the tincture, by water, similar to the method employed for obtaining podophyllin; the article obtained by this process is lighter colored than that had by the above, and the yield is much less, beside a great portion of the astringency of the Myricin is taken up by the water, and the agent possesses merely stimulant, with but slight astringent virtues.

History.—The profession are indebted to Messrs. F. D. Hill & Co., of this city, for first preparing and introducing this elegant article to their notice. It forms a light grayish-brown powder, with a peculiar, spicy smell, and a peculiar, bitterish-astringent taste, with some degree of persistent pungency. It is soluble in alcohol, partially soluble in ether, and its astringency is taken up by water, the rest being insoluble. Sulphate of iron forms a black inky liquid with the water in which Myricin has been agitated. It is perfectly soluble in water to which ammonia has been added.

Properties and Uses.—Myricin is a stimulant and astringent, and will be found a very advantageous remedy in chronic diarrhea and dysentery, in dysentery with typhoid symptoms, and in colliquative diarrhea of phthisis; in scarlatina it may be given with advantage, while a decoction of the bark is employed as a gargle; it will likewise be found a useful remedy for aphthous affections, when given internally, and applied locally. It forms an efficacious application to tender, spongy, bleeding gums, and an excellent snuff for polypus, also for headache and catarrhal affections. It is likewise beneficial in jaundice, and in combination with leptandrin and apocynin, I have successfully treated several cases of this affection. In some instances of cholera, it will be serviceable, given in combination with geraniin. Combined with leptandrin, podophyllin, or some other cathartic, it may be employed with benefit in the latter stages of typhoid fever. Dose, from two to ten grains of the powder, which may be repeated as often as required.

MYRISTICA MOSCHATA.

Nutmeg.

Nat. Ord.—Myristicaceæ. *Sex. Syst.*—Diœcia Monadelphia.

THE KERNEL OF THE FRUIT.

Description.—This is a tree from twenty to twenty-five feet high, having a grayish-brown and somewhat smooth bark, abounding in a yellow juice; the branches are spreading and in whorls. The *leaves*, which are alternate and on petioles from half to three-fourths of an inch long, plane above, are oblong, approaching to elliptical, subbifarious, glabrous, rather obtuse at the base, acuminate, quite entire, aromatic, dark-green and somewhat glossy above, paler beneath, and from three to six inches long. The *flowers* are diœcious, small, in axillary, subumbellate racemes, sometimes forked or compound. *Peduncles* and *pedicels* glabrous, the latter having a quickly deciduous, ovate bract at its summit, often pressed close to the flower. *Male flowers*, three to five or more on a peduncle. *Calyx* urceolate, thick and fleshy, clothed with a very indistinct reddish pubescence, dingy pale-yellow, cut into three, erect, or erecto-patent teeth. *Filaments* incorporated into a thickened, whitish cylinder, about as long as the calyx, the upper half covered by about ten linear-oblong, two-celled anthers, free at their base, opening longitudinally. The *female flowers* scarcely different from the male, except that the pedicel is very frequently solitary. *Pistil* solitary, shorter than the calyx, broadly-ovate, a little tapering upward into a short style, and bearing a two-lobed persistent stigma. *Fruit* a fleshy pericarp, nearly spherical, of the size, and somewhat of the shape of a small pear; flesh astringent, yellowish, almost white within, four or five lines thick, opening into two, nearly equal, longitudinal valves. The *arillus* (mace), is thick, between horny and fleshy, much laciniated, folded and anastomosing toward the extremity, almost enveloping the nut, and so tightly as to form inequalities on its surface; when fresh, it is brilliant scarlet; when dry, much more horny, of a yellow-brown color, and very brittle. The *nut* is oval or broadly ovate, with a hard, rugged, dark-brown, glossy *shell*, pale and smooth within, and about half a line thick. The *seed* or *nutmeg* is oval, pale-brown, quite smooth when fresh, but soon becomes shriveled, with irregular, vertical lines or furrows on its surface. Its substance or *albumen* is firm, fleshy, and whitish, being traversed by veins of a red-brown color, abounding in oil. Near the base of the albumen, and imbedded in a cavity in its substance, is the *embryo*, which is small, fleshy, yellowish-white, rounded below, and where is found the hemispherical radicle; its *cotyledons* of two, large, somewhat foliaceous, plicate lobes, in the center of which is seen the plumule.—*L.*

History.—The Nutmeg-tree is indigenous to the Molucca Isles, and is raised in Sumatra, French Guiana, the Mauritius, and various West Indian islands. The Nutmeg-tree is propagated by planting the uninjured seed; when it has attained the age of about nine years, it commences to blossom, and continues to yield fruit for about three-quarters of a century, requiring hardly any attention from its cultivators. In the Banda Isles there are three harvests annually, the principal one in July or August, in November, and in March or April. The ripe fruit is gathered by means of a barb attached to a long stick; the mace or arillus separated from the nut, and both separately cured.—*P.* The kernel of the fruit, or *nutmeg*, and the arillus of the nut, or *mace*, are the officinal parts; they are imported from the East Indies, from Europe, and a small portion from the West Indies.

The Nutmegs, previous to exportation, undergo a process of curing to preserve them, and protect them from the attacks of insects; the nuts are exposed to the sun for four or six days, and afterward smoke-dried for several weeks at about 140° F.; when thoroughly dried the kernel rattles in the shell, which is then cracked with a wooden mallet, and the perfect nuts selected; these are then covered with dry lime, or steeped for a time in a thick mixture of lime and water; the former is considered the preferable plan. Nutmegs are of a somewhat globular or elliptical shape. The finer kinds are small, short, nearly round, firm, heavy, externally marked with reticulated furrows, and lightish brown or white, from having been dipped for preservation in milk of lime; internally grayish-red, and beautifully marbled with darker brownish-red veins, from which oil may be easily expressed with the point of a warm knife. They have a strong, peculiar, delightfully fragrant odor, and a powerful, bitter, warm aromatic taste. Their virtues are extracted by alcohol or ether. According to Bonastre, they contain 54 per cent. of lignin, 24 of stearin, 7.6 of olein, 6.0 of volatile oil, 2.4 of starch, 1 of gum, and 0.8 of an acid substance. By submitting Nutmegs and water to distillation, the volatile oil may be obtained. The small, round heavy Nutmeg is esteemed superior to those which are larger, longer, lighter, less marbled, and not so oleaginous. It makes a grayish-brown, somewhat fatty powder. All inferior Nutmegs may be recognized by the above description.

The powder of Nutmegs beaten to a pulp with a little water, and pressed between heated plates, yields from ten to thirty per cent. of a fragrant, orange-colored, concrete oil, commonly, but incorrectly called Oil of Mace. It is the *Myristicæ Adeps* of the Edinburgh Pharmacopœia, and the *Myristicæ Oleum* of the London. The best quality of this oil is imported from the East Indies in stone jars; it is in rectangular cakes, enveloped in the leaves of some plant. It has the consistence of suet, and possesses the odor and taste of the Nutmeg. It is soluble in four parts of boiling alcohol, which deposits the solid part of the oil, *myristicin*, in silky crystals. The crude fat likewise contains a soft, yellowish or brownish oily substance, soluble in cold alcohol or ether, and a volatile oil. *Myristicin* is insoluble in cold alcohol or ether, melts at 88°, and is a compound of *Myristicic acid* and *glycerin*. An inferior concrete oil is prepared in Holland from spoiled Nutmegs. An artificial preparation is made by mixing together various proportions of tallow, spermaceti, etc., flavoring it with the essential oil of Nutmeg, and coloring it with saffron.

After the fruit of the Nutmeg-tree is gathered, the outside fleshy pericarp is either thrown away, or made into a preserve, while the arillus being cautiously removed from the nut, is compressed, exposed to the sun, and when dried, moistened with salt water, in order to aid in its conservation, and is then packed into sacks, forming the *mace* of commerce. Mace is in single or double blades, compressed, irregularly divided, smooth, somewhat flexible, of a cinnamon-yellow color, of an odor analogous to that of the Nutmeg, and a warm, sharp, aromatic, and fatty taste.—*P.*

The best mace is flaky and spread, and of a dingy yellow color. It is seldom used in medicine. By distillation a volatile oil is obtained which sinks in water; by pressure a fixed oil is procured, less concrete than that of Nutmegs. Henry's analysis of mace found it to contain a small amount of essential oil; a fragrant red fat oil, which was dissolved by ether and alcohol; a fragrant yellow fat oil, insoluble in alcohol, but dissolved by ether; alcohol extractive; amidin, and ligneous fiber with lime. Indifferent mace may be known by its pale, whitish or reddish color, its friability, and its feeble odor and taste.

Properties and Uses.—Both Nutmeg and mace possess aromatic stimulating properties, and are occasionally used to remove flatulency, correct the nausea arising from other drugs and to allay nausea and vomiting. The Nutmeg forms a very agreeable addition to various drinks for convalescents, as well as to some articles of diet; it is generally grated over them, or mixed with them. Applied locally, grated Nutmeg mixed with lard has been found an excellent application in piles—and the Nutmeg roasted is used in some parts of the country internally, as a domestic remedy for leucorrhea. I have known the following preparation to cure several cases of intermittent fever, and have been assured of its almost universal success in this disease. It is also recommended for the cure of other forms of fever. Char a Nutmeg by holding it in the flame, and permitting it to burn by itself without disturbance; when charred, pulverize it, combine it with an equal quantity of burnt alum, and divide the mixture into three powders. On the commencement of the chill give a powder—if this does not break it, give the second powder on the approach of the next chill, and if not cured, the third powder must be given as the succeeding chill comes on. Usually the first powder effects a cure, and it is seldom that the three powders are required. The bowels should always be acted upon by a purgative previous to their administration. It is certainly deserving attention, though I do not pretend to account for its action. Dose of Nutmeg or mace, from five to twenty grains. Larger doses possess narcotic qualities, and in doses of two or three drachms, dangerous symptoms have been produced.

Off. Prep.—Tinctura Lavandulæ Composita.

MYROSPERMUM PERUIFERUM.

Balsam of Peru.

Nat. Ord.—Leguminosæ (*De Candolle*); Amyridaceæ (*Lindley*). *Sex. Syst.*—Decandria Monogynia.

THE BALSAMIC EXUDATION OF MYROSPERMUM PERUIFERUM.

Description.—This is the *Myroxylon Peruiferum* of Linnæus; it is a large tree, with a thick, straight, smooth trunk, and a coarse, gray, compact, heavy, granulated bark, of a pale straw-color, filled with resin which, according to its quantity, changes the color to citron, yellow, red, or dark-chesnut; smell and taste grateful, balsamic and aromatic. The *leaves* are pinnated; the *leaflets* are alternate, of two, three, four, or even five pairs, ovate-lanceolate, acute, coriaceous, somewhat emarginate at the apex, shining above, hairy on the underside, marked with transparent spots, the terminal one the same size as the others. The *flowers* are in axillary racemes longer than the leaves. *Calyx* campanulate, nearly equally five-toothed, with the odd tooth remote from the others. *Petals* five, white; the upper reflexed, broad, roundish, emarginate; the other four distinct, linear-lanceolate, reflexed spreading. *Stamens* ten, distinct, spreading, shorter than the petals; *anthers* mucronate. *Samaras* pendulous, straw-colored, pedicellate, linear-oblong, about two inches in length, compressed, membranous, except at the apex which is obliquely rounded, clavate, one-celled, one-seeded. *Seed* reniform, lying in yellow liquid balsam, which hardens into resin.—*L.*

History.—Although the above is generally considered to be the tree which yields Balsam of Peru, yet there has been some doubt as to the characteristic species, and even at the present day the question is not thoroughly determined. The balsam met with in our markets, is not constant in quality or appearance, owing very probably to its being procured from several species of Myrospermum. The *M. Peruiferum* is common to the forests of Peru, in low, warm, sunny situations near the river Maranon, and in other portions of South America, flowering from July to October. *Quinquino* is the name bestowed upon it by the natives. The tree contains a large amount of balsamic juice, which is copiously discharged when the bark is incised; this is collected upon rags, which when saturated, are placed in water. Upon boiling, the balsam rises to the surface, from which it is removed, and put into vessels for purification and exportation. It generally reaches this country in tin cans, or pear-shaped earthenware pots.

Balsam of Peru has a dark reddish-brown color in thin layers, black in bulk, of the consistence of molasses, and having an agreeable balsamic odor, a hot, acrid, somewhat bitter taste, and the specific gravity 1.15. On exposure to the air it does not dry up; and is inflammable, burning with a fuliginous flame, and giving out an aromatic odor. It is soluble in a large proportion of alcohol, but only partially in ether; it is miscible with water by means of mucilage. Boiling water removes from it a crystalline acid, supposed by Stolze to be benzoic acid, and by Fremy, cinnamic. Various analyses have been made, but none of them are satisfactory. Supposed to contain an oily substance, called Cinnameine, resinous matter, benzoic acid, extractive, moisture, etc.

G. L. Ulex, *Jour. Pharm. & Trans. Vol. XII. p.* 549, from *Archiv. der Pharmacie, Jan.* 1853, gives the following mode of detecting the purity of Balsam Peru: "Ten drops of Peru balsam are mixed in a watch-glass with twenty drops of concentrated sulphuric acid, and then diluted with water. If the balsam is pure, a brittle resin is thus obtained, but when adulterated with castor-oil and similar substances, this residue is proportionately soft. Sulphurous acid is likewise disengaged, which is not the case when the adulterating substance is copaiba balsam." "To detect copaiba balsam, the substance is to be heated in a small tube retort, until a few drops of a yellow, oily liquid have passed over which takes place at a temperature of 374° F. This distillate is acid and soon deposits crystals of cinnamic acid. If the balsam was pure it solidifies completely, but when adulterated with copaiba, the crystals float in copaiba-oil. The distillate is then to be saturated with caustic potash, and the solution of cinnamate removed by means of blotting paper. The drops of oil which are then left mix quietly with iodine if the balsam was pure, but cause an immediate explosion if copaiba was present in it."

There is likewise a variety of Peruvian balsam, of a pale-yellowish color, syrupy, highly fragrant, and of a bitterish, acrid, somewhat aromatic taste. It is called White Peruvian Balsam, and is obtained by expressing the fruit. When dried, it constitutes the Dry Peruvian Balsam, or Indian Opobalsamum, and is of a reddish, pulverizable, resinoid character. The fruit infused in rum, is used for several medicinal purposes by the natives, under the name of *balsamito.*

Properties and Uses.—Balsam of Peru possesses expectorant and stimulating properties, acting more especially on mucous tissues, lessening their secretions when profuse. It is useful in all chronic affections of mucous tissue, as in catarrh, gonorrhea, mucous inflammation of the stomach and bowels, chronic diarrhea and dysentery, leucorrhea, etc. Externally, it forms an excellent application to obstinate ulcers, wounds, ringworm of the scalp, and other cutaneous affections. It may be applied alone, or in ointment made by melting it with an equal part by weight of tallow. The dose is from ten to thirty drops, and is best given diffused in water by means of sugar and the yolk of egg, or gum arabic.

MYROSPERMUM TOLUIFERUM.

Balsam of Tolu.

Nat. Ord.—Leguminosæ. *Sex. Syst.*—Decandria Monogynia.

THE BALSAMIC EXUDATION OF MYROSPERMUM TOLUIFERUM.

Description.—A full description of this tree has not been given. It is supposed to be very like the preceding, differing as follows: the *leaflets* are thin, membranous, obovate, taper-pointed; the terminal one larger than the others.—*L.*

History. — As with the preceding article, so with the present, it is involved in considerable obscurity; it being uncertain whether the same trees which yield balsam of Peru, furnish likewise that of Tolu. Some consider that the two balsams are derived from the same species, and that the method of gathering, etc., causes their dissimilarity.

The *M. Toluiferum*, which is undoubtedly one species from which Tolu is obtained, is found in many parts of South America, especially on the elevated plains and mountains near Carthagena, Tolu, and in the Magdalena province of Colombia. The balsam is said to be obtained by incisions made into the tree, from which it flows into wax vessels placed for the purpose, and in which it solidifies. It is imported from Carthagena in tin, earthen, and other vessels. When first received in this country it is soft and adhesive, but becomes solid and brittle by time and exposure to the air, somewhat resembling resin, and with a crystalline appearance. It has a pale, yellowish-red, or brown color, an agreeable, vanilla-like, or benzoinic odor, and a sweetish, aromatic, resinous taste. It softens when chewed, melts when heated, and when burned evolves a fragrant odor. It is soluble in alcohol, ether, and the essential oils; and water at 212° F. takes up its cinnamic acid. It yields very little volatile oil when distilled with water, and if the distillation be continued, its acid sublimes. Mr. Hatchett found, that when he dissolved it in the smallest possible quantity of liquor-potassa, it completely lost its own odor, and assumed a most fragrant smell, somewhat resembling that of the clove-pink.—*T.* Its chemical composition has not been satisfactorily ascertained. According to Fremy it consists of cinnaméine, cinnamic acid, and resin, and the balsam resinifies with greater facility than the balsam of Peru. About eight parts of volatile oil are obtained from four thousand parts of Tolu; this oil contains a radical oil, *Tolene*, $C_{10} H_8$. Guibort states, that as the balsam solidifies, its odor becomes more feeble, but its quantity of cinnamic acid is augmented, and which is probably owing to the action of the atmosphere upon its oil effecting a chemical change.

G. L. Ulex, *Pharm. Journ. and Trans.*, *p.* 550, *Vol. XII.*, from *Archiv. der Pharmacie*, *Jan.*, 1853, gives the following mode of detecting the purity of Balsam Tolu: "Pure Tolu Balsam, heated in sulphuric acid, dissolves without any engagement of sulphurous acid, yielding a cherry-red liquid. When, however, colophony, with which it is frequently adulterated is present, the substance blackens, swells up, and disengages much sulphurous acid."

Properties and Uses.—Balsam of Tolu, like that of Peru, is a stimulant tonic and expectorant, and may be used as a substitute for it, in chronic catarrhs, and other pulmonary affections, not inflammatory in their character. It is usually preferred on account of its more agreeable flavor, and for which it is often added to cough-mixtures. The balsam, dissolved in ether, and the vapor therefrom inhaled, is reputed beneficial in coughs and bronchial affections of long-standing. Two parts of Tolu, three of almond oil, four of gum arabic, and sixteen of rose-water, make an excellent liniment for excoriated nipples. The dose is from ten to thirty grains, frequently repeated, and given in tincture, syrup, or similar to balsam of Peru.

Off. Prep.—Mistura Sanguinariæ Composita; Syrupus Tolutanus; Tinctura Tolutani; Tinctura Benzoini Composita.

MYRTUS PIMENTA.

Pimento.

Nat. Ord.—Myrtaceæ. *Sex. Syst.*—Icosandria Monogynia.

THE UNRIPE BERRIES.

Description.—This tree, the *Eugenia Pimenta* of De Candolle, is an evergreen, reaching to the height of twenty-five feet, or more; its trunk is erect, with many round branches toward the summit; the twigs are compressed, the younger and the pedicles downy. The *leaves* are opposite, entire, oblong or oval, with pellucid dots, somewhat opaque, smooth. The *flowers* are small, and are in axillary and terminal, trichotomous panicles; some flowers are four-fid and subsessile in the forks of the panicle. *Calyx-tube* nearly globose; limb divided down to the ovary into four roundish segments. *Petals* four, greenish-white. *Stamens* numerous, distinct; *ovary* two-celled. *Berry* globose, one-seeded, black, the size of a pea. *Embryo* roundish, with the cotyledons consolidated.—*L.*

History.—The Allspice, or Pimento tree is a native of South America, and the West India Islands, especially Jamaica. The tree completes its growth in about seven years, though fruit may be had from it in its third year; it flourishes best in a limestone soil. The unripe berries are the officinal part, and are more generally known by the name of *Allspice*. Other names, as *Jamaica Pepper*, *Bayberry*, etc., have been given to them. They are gathered just before maturity, thoroughly dried, and then packed for foreign markets. When these trees are in blossom they emit a most delicious fragrance.

Pimento, or Allspice, when dried, becomes brownish-black, round, wrinkled, and umbilicate at the apex. It consists of a hard, brittle outer covering, which is yellowish internally, and envelopes two dark-brown seeds.

Its odor is strongly aromatic, and its taste, strong, hot, aromatic, combining that of cinnamon, nutmegs, and cloves, whence is derived its name, *all-spice.* Boiling water takes up the aroma, and alcohol all the active properties. The infusion is brown, and has an acid reaction on litmus paper. The berries are found to contain a volatile oil, which may be obtained by distillation, a green fixed oil, of a burning aromatic taste, a concrete, yellowish, flaky, oleaginous substance, extract containing tannic acid, gum, brown coloring-matter extracted by potassa, resinous matter, extract containing sugar, malic and gallic acids, lignin, salts, and moisture. The seeds contain only half the proportion of volatile oil, and three times as much astringent extract. Braconnot's analysis differed from the above by Bonastre; he found volatile oil, amylum, reddish wax, gum, azotized matter, citrate of potassa, phosphate of potassa, and lignin.

Properties and Uses.—Pimento is a hot, aromatic stimulant and carminative, and may be used where such agents are indicated. It is seldom employed in medicine, but is used largely as a hot aromatic in cookery; and sometimes it is added to other medicines to render them more agreeable. A tincture has been advised as a local remedy in chilblains. Dose of the powder, from ten to thirty grains; of the tincture, from one to two fluidrachms; of the oil, from two to five drops.

Off. Prep.—Aqua Pimentæ; Tinctura Guaiaci Ammoniata.

NABALUS ALBUS.

Lion's Foot.

Nat. Ord.—Compositæ, *Tribe* Cichoraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE PLANT.

Description.—This plant, also known as *White-Lettuce*, and *Rattlesnake Root*, is the *Prenanthes Albus* of Linnæus. It is an indigenous perennial herb, with a smooth somewhat glaucous *stem*, corymbose paniculate at the summit, stout, purplish, often deeply so in spots, and from two to four feet in height. The radical *leaves* are angular-hastate, often more or less deeply three to five lobed; the uppermost cauline ones lanceolate, and between these the intermediate forms hastate and ovate, petiolate, and all irregularly dentate. *Heads* pendulous, glabrous; *involucre* of eight linear scales, nine to twelve flowered; *scales* purplish; *corollas* whitish. *Pappus* brown.—*W.*—*G.*

There is a variety of the above plant, *Nabalus Serpentaria* or *Prenanthes Serpentaria*, with rough dentate *leaves*, of which the *radical* are palmate, the *cauline* with long footstalks, sinuate-pinnatifid, disposed to be three-lobed, with the middle lobe three-parted, and the *upper* lanceolate. The *racemes* are terminal, somewhat panicled, short, and nodding, with an eight-cleft calyx, and twelve florets; it is about two feet high, with purple flowers.—*W.*—*G.*

History.—This plant is found in moist woods and shades, in rich soils, from New England to Iowa, and from Canada to Carolina, flowering in August. The variety *N. Serpentaria* is common to the mountainous districts of Virginia, North Carolina, and other sections of the United States, and is considered more active than the *N. Albus*. The root, leaves, and juice of the plant are employed. It has not been analyzed.

Properties and Uses.—Said to be an antidote to the bite of the rattlesnake, and other poisonous serpents. The milky juice of the plant is taken internally, while the leaves steeped in water are to be applied to the wound, and frequently changed. A decoction of the root, which is bitter, has been successfully used in the bite of the rattlesnake, also in dysentery. This plant is deserving further and more accurate investigation.

NECTANDRA RODIÆI.

Bebeeru.

Nat. Ord.—Lauraceæ. *Sex. Syst.*—Dodecandria Monogynia.

THE ALKALOID CONTAINED IN THE BARK.

Description.—This is a magnificent forest tree, growing from sixty to eighty feet in height, branching near the summit, and covered with a smooth ash-gray bark. The *leaves* are nearly opposite, smooth, shining, coriaceous, five or six inches long, and two or three broad. The *flowers* are obscure, whitish-yellow, cordate, and disposed in axillary panicles. The *fruit* is a globular berry, about six inches in circumference, having a woody, grayish-brown, speckled pericarp, and a seed with two large plano-convex cotyledons, which is yellow when freshly cut, and possesses an acid reaction and an intensely bitter taste. The fruit abounds in bitter starch.—*Schomburgk.*

History.—This tree is a native of British Guiana, and its bark has been recently introduced by Dr. Rodie, as an energetic tonic and febrifuge. It is in flat pieces of one or two feet in length, from two to six inches broad, and about four lines in thickness, hard, heavy, brittle, with a rough fibrous fracture, dark cinnamon-brown and rather smooth internally, and covered externally with a brittle grayish-brown epidermis. It has little or no odor, but a strong persistent bitter taste, with considerable astringency. The fruit is about the size of a small peach, somewhat heart-shaped, or inversely ovate, slightly flattened, the outside coat being frangible, and the kernel pulpy; it is exceedingly bitter. The sulphate of Bebeerina is obtained from the bark and seeds. The process for obtaining it is essentially the same as that for sulphate of quinia. The bark is at first freed of tannin and coloring matter by boiling it with carbonate of soda; it is then exhausted by boiling in water acidulated with sulphuric acid, and the alkaline matter is thrown down from the concentrated acid liquor by means of carbonate of soda. The impure bases thus separated are washed, dissolved, and neutralized with weak sulphuric acid, and the solution is treated with animal charcoal, concentrated, filtered again, and finally evaporated in thin layers in flat vessels. Any excess of acid must be carefully avoided, otherwise the salt will be charred on evaporating it to dryness.

The sulphate of Bebeerina of the shops, contains both Bebeerina and sipeerina, another alkaline principle also discovered by Dr. Rodie. It occurs in thin, somewhat glittering scales of a brownish-yellow color (sometimes with a greenish tinge), and forming a yellow powder. It is inodorous, and has an intensely bitter, persistent, and somewhat astringent taste. Like the sulphate of quinia, it requires an excess of acid for its perfect solution ; hence the addition of a few drops of diluted sulphuric acid renders its solution more complete. It is also soluble in spirit. When well prepared, the scale-like particles should be glittering and translucent, and ought, when incinerated to leave no ash, or a mere trace only. In this way, sulphate of lime, the only important impurity which has been found in it, may be easily detected. When carefully dried it contains 90.83 per cent. of base, and 9.17 of sulphuric acid.

Pure Bebeerina may be obtained as follows : Decompose the commercial sulphate by ammonia, and carefully wash the alkaline precipitate with cold water, and while still moist, triturate it with an equal weight of freshly precipitated and moist hydrated oxide of lead. The magma thus formed is then dried over the water-bath, and the alkali is taken up by absolute alcohol. On distilling off the spirit, the organic base is left in the form of a transparent orange-yellow resinous mass, containing sipeerina. This is dried, pulverized, and treated with successive portions of pure ether, which dissolves the Bebeerina, leaving the sipeerina behind. The ether is distilled and evaporated, and pure Bebeerina is obtained in the form of a translucent, amorphous, but homogeneous resinous-looking substance, of a pale-yellow color, and possessed of all the properties of an organic alkali. Bebeerina does not crystallize ; it is very soluble in alcohol, less so in ether, and very sparingly in water. When heated it fuses ; and the heat being continued, it swells up, giving off vapors of a strong peculiar odor and burns without residue. It forms non-crystallizable salts with acids. With bichromate of potassa and sulphuric acid it gives a black resin, and a yellow with nitric acid.

M. A. De Planta has still further purified Bebeerina, and obtained it in a colorless powder, inodorous, unalterable in the air, highly electric, very soluble in water, but dissolving more easily in ether, and in all proportions in alcohol. He takes the Bebeerina obtained by the above process of Maclagan and Tilley, and treats it with acetic acid, which imperfectly dissolves it; to the filtered liquor he adds an excess of acetate of lead, and then potassa, until a precipitate is formed. The combination of Bebeerina and oxide of lead, which is thus obtained, is dried in a water-bath, and exhausted with ether. On distilling away the ether, after filtering, the Bebeerina is left in the form of a syrupy mass, having a slightly yellow color. It is dissolved in absolute alcohol, and the solution in a concentrated state, added drop by drop, to cold water kept constantly agitated. It forms a thick precipitate, which may be collected on a filter, washed and dried without agglutinating.

Properties and Uses.—Bebeerina and its sulphate is a tonic and antiperiodic, and is applicable to the same forms of disease as those in which quinia is employed. It increases the appetite, raises the pulse a little, and improves the tone of the constitution generally, with but little tendency to produce ringing in the ears, headache, vertigo, or other nervous symptoms, as is the case with quinia, except when given in large or frequently repeated doses. It has been used with success in intermittent and remittent fevers, but is inferior to quinia, although a valuable substitute for it. It has been found of decided benefit in periodic headache and other periodic neuralgias, as well as in atonic dyspepsia, and general debility. It seems to be specially applicable to persons of a strumous or phthisical habit, and in the latter stages of phthisis has strengthened the system, improved the appetite, and checked night-sweats. In strumous ophthalmia, and in pregnancy requiring tonic treatment, it has been highly prized by many practitioners. The dose of Sulphate of Bebeerina is from one to three grains as a tonic, and from five to twenty as a febrifuge. It may be given in pill with conserve of roses, or in solution. Half a drachm of the sulphate, twenty-five minims of elixir vitriol, a fluidounce each, of syrup, and tincture of orange peel, and four fluidounces of water, mixed together, form an excellent solution for general tonic purposes; of this a tablespoonful may be given three times a day, each dose containing about two and a half grains of the salt.

NEPETA CATARIA.

Catnip.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE TOPS AND LEAVES.

Description.—*Catnip* or *Catmint* is a perennial herb, with an erect, square, hoary-tomentose, branching *stem*, two or three feet in height. The *leaves* are opposite, cordate, oblong, petiolate, coarsely crenate-serrate, covered with a soft, hoary down, paler beneath. The *flowers* are many, white, or purplish, the lower lip dotted with crimson, and are disposed in whorled spikes, which are slightly pedunculated. *Calyx* dry, striate, tubular, obliquely five-toothed. *Corolla* naked and dilated in the throat, two-lipped, twice the length of the calyx; the upper lip rather concave, erect, notched, or two-cleft; the lower spreading, three-cleft, the middle lobe largest and crenate. *Stamens* four, ascending under the upper lip; *anthers* approximate in pairs, the cells divergent.—*G.*—*W.*

History.—Catnip is a very common, naturalized plant, growing about old buildings and fences, and on waste and cultivated lands, flowering from June to September. It is a native of Europe. The tops and leaves are officinal; they have a strong, characteristic odor, not very grateful to many persons, and a peculiar, bitterish taste. Their virtues are imparted to boiling water by infusion. It appears to be very much liked by cats, preventing, it is said, attacks of fits to which they are subject, and also producing an aphrodisiac influence upon them. Its active constituents are essential oil, and that variety of tannic acid which strikes a green color with the ferruginous salts.

Properties and Uses.—Catnip is diaphoretic and carminative in warm infusion; tonic, when cold. It is also antispasmodic, emmenagogue, and diuretic. In warm infusion it is used in febrile diseases as a diaphoretic, and to promote the action of other diaphoretics, as well as to allay spasmodic action and produce sleep; it is also given as a carminative and antispasmodic in the flatulent colic of children; and as an emmenagogue or uterine tonic, it has proved decidedly beneficial in amenorrhea and dysmenorrhea, and has likewise been successfully employed in nervous headache, hysteria, and nervous irritability. The leaves are reputed beneficial in toothache, when masticated and applied to the decayed tooth. A warm infusion of saffron and Catnip is a very popular and beneficial remedy in colds, febrile and exanthematous diseases to which infants and young children are subject. A fluid-extract of Catnip, valerian and scullcap forms an excellent agent for the cure of nervous headache, restlessness, and many other nervous symptoms. The expressed juice of the herb, given in doses of a tablespoonful two or three times a day, is decidedly a superior remedy in amenorrhea, often restoring the menstrual secretion after other means have failed. The leaves are frequently used in fomentation as a local application to painful and inflammatory affections. Of the dried leaves in powder, two drachms may be given for a dose in some liquid, as cold or warm water; the infusion, made by adding an ounce of the dried herb to a pint of boiling water, covering it, and allowing it to stand for a few minutes, may be drank as freely as the stomach will permit.

Off. Prep.—Infusum Nepetæ.

NEPETA GLECHOMA.

Ground Ivy.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE LEAVES.

Description.—This plant, the *Glechoma Hederacea* of Linnæus, is a perennial, gray, hairy herb, with a prostrate, creeping *stem*, radicating at base, square, and varying in length from a few inches to one or two feet. The *leaves* are petiolate, opposite, roundish, cordate-reniform, crenate, hairy, and glaucous on both sides; *floral leaves* of the same form. The *flowers* are bluish-purple, about three together in axillary whorls. The *corolla* is about three times as long as the calyx, with a variegated throat. *Calyx* long, curved, villous, with the limb oblique, and the teeth lanceolate-subulate, the upper being the largest. *Bracts* scarcely so long as the pedicel. The two *anthers* of each pair of stamens meet with their two divaricate cells, forming the appearance of a cross.—*L.—W.—G.*

History.—This plant is common to Europe and the United States, where it is found growing in shady places, waste grounds, dry ditches, fences and hedges, and on the sides of moist meadows, flowering in May, and August. The leaves are the parts used, and yield their virtues, by infusion, to boiling water. They have an unpleasant odor, and a harsh, bitterish, slightly aromatic taste. It is also called *Gill-over-the-ground.*

Properties and Uses.—Ground Ivy is stimulant, tonic, and pectoral, and has been recommended in diseases of the lungs, and kidneys, asthma, jaundice, hypochondria, and monomania. An infusion of the leaves is highly recommended in lead colic, and it is stated that painters who make use of it often are never troubled with that affection. The fresh juice snuffed up the nose, is said to cure the most inveterate headache. Dose of the powdered leaves, from half a drachm to a drachm; of the infusion one or two fluidounces.

NICOTIANA TABACUM.

Tobacco.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—This is an annual herb, with a long fibrous *root*, and an erect, round, hairy, viscid *stem*, branched toward the top, and from four to six feet in height. The alternate *leaves* are sessile, ovate or lanceolate, acuminate, decurrent, viscid, pale-green, and one or two feet long by six or eight inches broad. The *flowers* are rose-colored, in panicles at the ends of the stem and branches. *Bracts* linear, acute. *Calyx* urceolate, hairy, glutinous, half as long as the corolla, ending in five acute segments. *Corolla* funnel-shaped, swelling toward the top, the border dull-red, expanding, with five acute, crimped lobes. *Stamens* five; *filaments* inclined to one side, with oblong anthers. *Ovary* ovate; *style* long and slender; *stigma* capitate, cloven. *Capsule* ovate, invested with the calyx, two-celled, two-valved, but opening crosswise at top, loculicidal; *seeds* very numerous, small, somewhat reniform, attached to a fleshy receptacle.—*L.—W.—R.*

History.—Tobacco is a native of the hotter parts of America, and was first exported to Europe in 1586, by Sir Walter Raleigh. At present it is raised in many parts of the world, and especially in the Middle States of this country. The strongest and more commonly-used Tobacco is raised in Virginia, but the Cuban or Havana leaf is preferred by smokers. The plant flowers in July. In cultivating Tobacco the seeds are thickly sown in beds of prepared soil; the young plants from which are reset in the last month of spring, into fields, where they are placed in rows at distances of two, three, or four feet apart; and in order to obviate the flowering and consequent formation of seed, the tops are removed from time to time. Close vigilance is required until the plant is ready for harvest, which is generally in the last summer month, when the matured plants are cut off just above their roots, hung up in bundles under sheds to dry, after which the leaves are removed from the stalks and packed up for the market. There are several varieties of this plant, all of which appear to possess analogous virtues. Soil and the peculiar method adopted in raising the plant, are said to influence its quality. Commercial Tobacco is usually of a dark-brown, or orange-brown color, though its shades differ, of a powerful, heavy, disagreeable odor, and a peculiar, bitter, sickening taste, followed by a very disagreeable sense of acridity in the fauces. The dark leaves are much stronger and more powerful in their action than the light-colored. Water or alcohol extracts its virtues; boiling materially impairs its activity, especially if continued for a length of time. Many chemists have analyzed it, and with various results. Posselt and Reinmann found the fresh leaves to contain nicotina 0.06: nicotianin 0.01; bitter extractive 2.87; gum with malate of lime 1.74; chlorophyll 0.267; gluten and albumen 1.308; malic acid 0.51; lignin, and a trace of starch 4.969; sulphate, malate and nitrate of potassa, chloride of potassium, phosphate and malate of lime, and malate of ammonia 0.734; silica 0.088; water 88.280. Conwell's analysis gave gum, mucilage, tannic acid, gallic acid, chlorophyll, green pulverulent matter soluble in boiling water, yellow acrid oil, pale yellow resin, nicotina, nicotianin, an orange-red coloring matter, and a substance analogous to morphia.—*P.* M. E. Goupet has detected citric acid in Tobacco.—*Chem. Gaz.*, 1846, *p.* 319.

Nicotia or *Nicotina* is not volatile in Tobacco, on account of its existing in the form of a salt. It has been obtained by Vauquelin, Hermbstadt, and Posselt and Reinmann, but not in a state of purity. To obtain it pure the process of Henry and Boutron Charlard must be adopted, as follows: A pound avoirdupois of Tobacco, together with 332 cubic inches of water, and 6 $\frac{4}{10}$ ounces avoirdupois of caustic soda were put into a cucurbite. A moderate heat was first applied, and then the liquid was made to boil. What distilled over was received into a glass vessel, containing rather more than an ounce of sulphuric acid, diluted with three times its weight of water. When about 150 cubic inches have passed over, the process is stopped. The product, which must be kept slightly acid, is evaporated down to about 1,500 grains, and then allowed to cool. In order to separate it from the deposit formed, it is to be filtered, mixed with an excess of caustic soda, and distilled in a small retort. A colorless, acrid, and volatile liquid is obtained, which is concentrated in vacuo to the consistence of a syrup. This has an amber color, and in a few days deposits minute crystalline plates of nicotia, which soon absorb moisture, and form a transparent, almost colorless fluid.—*T.*

Another method by Schloesing is to digest an aqueous extract of the leaves in alcohol, which extracts the salts of nicotina; decant the solution, concentrate it, mix it with a solution of potassa, and briskly shake it with ether, which dissolves the nicotina set free by the potassa. To purify it, add gradually powdered oxalic acid to its solution, which forms an oxalate of nicotina, insoluble in ether, and which is deposited at the bottom of the vessel, resembling a layer of syrup. This is to be repeatedly shaken with pure ether, the nicotina separated by potassa and ether, as before. The ethereal solution is distilled in a water-bath, then transferred to a retort, through which a current of dry hydrogen circulates; then exposed to a temperature of 284° F. in an oil bath to remove the moisture, ether and ammonia; and finally the heat is raised to 356°, when the nicotina distills over drop by drop.

As commonly procured, nicotia is in the form of an oleaginous, transparent, colorless, tolerably fluid, anhydrous liquid, of the density of 1.048, becoming slightly yellow with keeping, and tending to become brown and thick from contact with the air, from which it absorbs oxygen; it remains liquid at 22° F., and volatilizes at 77°, leaving a carbonaceous residue. When cold it has but little odor; its taste is persistently acrid and caustic even when diluted. The vapor which rises from its volatilization, presents such a powerful smell of Tobacco, and is so irritating, that it is difficult to breathe in a room in which one drop of it has been spilt; if this vapor be approached with a lighted taper, it burns with a white smoky flame, and leaves a carbonaceous residue. It strongly blues reddened litmus paper; and is soluble in water, alcohol, oil of turpentine and fat oils, also in ether, which easily separates it from an aqueous solution. It combines directly with acids, disengaging heat, and forming difficultly crystallizable salts, of a deliquescent character, having an acrid, burning taste, and losing a portion of their base by heat; the double salts which it yields with the different metallic oxides crystallize better. Heated with stearic acid it dissolves and forms a soap, which congeals on cooling, and is slightly soluble in water, and very soluble in heated ether. The amount of nitrogen contained in it is unusually large, its composition being $C_{20} H_{14} N_2$, and its equivalent weight 162. It is the active constituent of Tobacco, and is a most virulent poison. A dog has been destroyed by a single drop of it, and small animals are killed by its odor. It exists in various proportions in different Tobaccos, varying from 3.8 to 11.28 parts in 1,000. Smokers in respiring the smoke of Tobacco introduce into their bodies a certain quantity of the vapor of nicotia; and the empyreumatic oil of Tobacco, formed in the pipe of the smoker, is an active poison, and consists of nicotia attached to a true volatile oil. Tannic acid forms a slightly soluble compound with nicotia, and may be exhibited as an antidote to it.

Nicotianin, discovered by Hermbstadt, may be obtained by Posselt and Reinmann's process, thus: Distill a mixture of six pounds of fresh Tobacco leaves, and twelve pounds of water, till one-half the liquid has passed over. Add to the liquor six pounds of water, and distill a second time. Repeat this a third time. On the surface of the liquid which has distilled over, about eleven grains of nicotianin swims.—*T.* It is a white, fatty, crystalline substance, with the odor of Tobacco, and its bitterish, warm taste, without its acridity. Heat volatilizes it. It is insoluble in water, but dissolves readily in alcohol or ether. It is insoluble in the dilute acids, but soluble in caustic potassa.—*T.* Placed to the nose, it causes sternutation, and a single grain of it has, when swallowed, produced vertigo and a disposition to vomit.

The *empyreumatic oil* obtained from Tobacco is an active poison; it has a very deep-brown color, a disagreeable, characteristic odor, and a pungent caustic taste; it may be obtained by distillation of the leaf in water, or a small quantity may be procured from the pipe of a smoker. One drop destroyed a cat, and two drops a dog, in five or six minutes; in each instance the oil was introduced within the rectum.—*Sir B. Brodie.*

Properties and Uses.—Tobacco is a potent acro-narcotic poison. The infusion is more apt to affect the heart, and its smoke to act on the brain —the former being followed by great feebleness of the pulse, fluttering of the heart, faintness, alarm, etc., while the latter occasions nausea and vomiting, followed by drowsiness. Medicinally it is a sedative, emetic, diuretic, expectorant, discutient, antispasmodic, errhine, and sialagogue. Seldom used internally, except in cases where from extreme insensibility of the stomach, ordinary emetics will not operate. The smoke injected into the rectum, or the leaf itself in the shape of a suppository, and introduced into the rectum, has been beneficial in strangulated hernia, obstinate constipation from spasm of the bowels, in retention of urine from spasmodic urethral stricture, hysteric convulsions, worms, and in spasms caused by lead; likewise in croup, asthma, and in inflammation of peritoneum to produce evacuations of the bowels, moderating reaction, and dispelling tympanitis. To use the infusion of smoke, blow the smoke into milk or water and inject.

In croup and spasm of the rima glottidis a plaster made of Scotch snuff and lard, and applied to the throat and breast, has proved very effectual; or a cataplasm of the leaves may be employed. An ointment of Tobacco has been found valuable in several forms of cutaneous disease. The leaves in combination with belladonna or stramonium leaves, will be found an excellent application to old, obstinate ulcers, painful tumors, and for spasmodic affections. Almost a certain cure for piles, is the application of a wet leaf to the parts, and maintained there for three or four hours. The inspissated juice has cured facial neuralgia, being rubbed along the track of the affected nerve. In using Tobacco at all, great caution should always be observed, and if it produce great depression, or too lasting a sedative effect, stimulants, as ammonia or brandy, should be administered. The quantity for an injection ought not to exceed a scruple at first; if this fails, cautiously increase it, for even half a drachm has often proved fatal; if the injection do not come away in five minutes, it should be assisted by throwing up a large quantity of warm water. Tobacco ought never to be used internally, as we have other agents, much safer and fully as effectual, to meet every indication desired.

Off. Prep.—Infusum Tabaci; Oleum Tabaci; Unguentum Tabaci.

NYMPHÆA ODORATA.

White Pond-lily.

Nat. Ord.—Nymphæceæ. *Sex. Syst.*—Polyandria Monogynia.

THE ROOT.

Description.—White Pond-lily has a blackish, large, fleshy, perennial *root*, or *rhizoma*, growing in mud where the water is from three to ten feet in depth, and is often as thick as a man's arm, sending up leaves and flowers to the surface. The *petioles* are long, somewhat semicircular, and perforated throughout by long tubes or air-vessels which serve to float them. The *leaves* are floating, orbicular, sometimes almost kidney-shaped, peltate, cordate-cleft at the base quite to the insertion of the petiole, the lobes on each side prolonged into an acute point, entire, reddish with prominent veins beneath, dark shining-green above, and five or six inches in diameter. The *flowers* are large, white or rose-colored, and fragrant. The *sepals* are four, lanceolate, green without and white within. The *petals* are numerous, lanceolate, from an inch to two and a half inches long, of the most delicate texture, white, sometimes tinged with purple on the outside. *Stamens* numerous, yellow, in several rows; *filaments* dilated gradually from the inner to the outer series so as to pass insensibly into petals. *Anthers* in two longitudinal cells growing to the filaments, and opening inwardly. *Stigma* with from twelve to twenty-four rays, very much resembling abortive anthers, at first incurved, afterward spreading. The *pericarp* is berry-like, many-celled, many-seeded.—*L.*—*W.*—*G.*

History.—This plant grows in ponds, marshes, and sluggish streams in most parts of the United States, flowering from June to September; the flowers shut at night and open about sunrise, and the seeds ripen under water. The root is the officinal part, and becomes light, spongy and friable on drying. It has an astringent and bitter taste, and readily imparts its virtues to water. It is said to contain considerable tannic and gallic acid, with starch, mucilage, resin, sugar, ammonia, ulmine, tartaric acid, fecula, etc. The root should be collected in the fall, freed from dirt, cut into slices and carefully dried.

Properties and Uses.—The root is astringent, demulcent, anodyne and anti-scrofulous. Used in dysentery, diarrhea, gonorrhea, leucorrhea, and scrofula, and combined with wild cherry in bronchial affections. Externally, the leaves and roots have been used in form of poultice to boils, tumors, scrofulous ulcers, and inflamed skin. In infusion, used as a gargle in ulcers of mouth and throat, and as an injection in leucorrhea. I recollect a lady, who, several years since, was pronounced by several physicians to have uterine cancer, and which resisted all their treatment; she was permanently cured by a squaw who gave her to drink freely of the decoction of a root, as well as to inject it in the vagina, which proved to be that of the White Pond-lily. The dose of the powdered root is half a drachm in milk or sweetened water; but its best form of administration is the infusion made by macerating for thirty minutes, one ounce of the coarsely-powdered root in a pint of boiling water, of which from two to four fluidounces may be given three or four times a day.

The Yellow Pond-lily, *Nuphar Advena*, called also *Spatterdock*, *Frog-lily*, etc., possesses similar properties, and may be used as a substitute. It has a large and extensively creeping rhizoma, with large erect *leaves*, or floating on half-cylindrical petioles, oval, rounded at apex, with rounded, diverging lobes at base, dark shining-green above, and when floating, pale and slimy beneath. The *flowers* are rather large, globular, erect, yellow, on a thick, rigid stalk. *Sepals* six, the three outer yellow inside, the three inner entirely yellow. *Petals* numerous, small, yellow, furrowed externally, and inserted with the stamens on the torus. *Stamens* numerous, truncated, linear. *Stigma*, sessile, discoid, with prominent rays. *Fruit* an ovoid, naked pericarp, many-celled, and many-seeded. It is a very common plant in ponds, ditches, muddy lakes, and mostly in shallow water.—*W.*—*G.*

Off. Prep.—Cataplasma Nymphæ; Infusum Nymphæ.

ŒNANTHE PHELLANDRIUM. (*Phellandrium Aquaticum.*)

Water Fennel.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE SEEDS.

Description.—This plant, also known by the names of *Water-Dropwort*, *Fine-leaved Water-hemlock*, is a biennial or perennial, umbelliferous herb, having a thick, spindle-shaped root, with many whorled fibers. The *stem* is hollow, furrowed, half immersed in the water, very bushy, with numerous spreading, leafy branches, and from two to four feet in height. The *leaves* are petioled, spreading, repeatedly pinnate, cut, with innumerable fine, expanded, dark-green, shining, acute segments. The *umbels* are opposite to the leaves, on shortish stalks, about five-rayed, without any general bracts. Partial umbels are very dense, of numerous short rays, accompanied by many narrow, taper-pointed bracts. The *flowers* are white, numerous, all fertile, the outer ones largest and most irregular; the innermost more certainly prolific. *Styles* long, filiform, spreading, capitate. *Fruit* ovate, rather compressed, purplish, smooth, oblong, crowned with the minute spreading calyx, and rather short, permanent, slightly-spreading styles; the dorsal ridges distinct, but little elevated, the lateral ones much broader and thicker; all confluent below the calyx. *Pedicels* shorter than the fruit.—*L.*

History.—This plant is common to Europe, growing in ditches and wet places, and its leaves are reputed harmful to cattle, causing a species of palsy after eating it. It is poisonous but not so dangerously as the *Œnanthe Crocata*, Dead-tongue, or Hemlock-dropwort, which is considered the most energetic poison of the narcotico-acrid Apiaceæ. By desiccation, they lose much of their poisonous properties. The Œ. Phellandrium is occasionally found in this country. The *seeds* are the parts used, they are about the twelfth of an inch long, of a yellowish-green color, elliptical, slightly curved, flat on one side and gibbous on the other, striated with ten filiform ribs, and terminate in small five-toothed heads, the remains of the calyx and styles. They have a peculiar, strong odor, somewhat resembling *angelica*, and an acrid, spicy taste, owing to a volatile oil, which they contain in abundance. The poisonous principle of this plant has been discovered by M. Hulet, an apothecary at Lyons. He names it *Phellandrine*, and procures it from the seeds, which contain an average of two or three per cent. of it. Seven and a half grains of it, injected into the veins of a dog produced, in a few moments, a difficulty of respiration, nervous tremblings, and anxiety, lasting some hours; he recovered, however. Two birds into whose beaks the same dose was introduced, died in fifteen or twenty minutes. We are not informed of its method of preparation.

Properties and Uses.—Water Fennel is a mild narcotic stimulant, expectorant, alterative, and diuretic. In large doses it produces dizziness, inebriation, and dull pains in the head. The seeds have been most successfully used in chronic affections of the air-passages, as laryngitis, asthma, hemoptysis, catarrh, etc., also in periodical febrile diseases, dyspeptic affections, and in indolent ulcerations. They are given in powder, commencing with four or five grains, every one or two hours throughout the day, cautiously increasing the dose to eight or ten grains. Two parts each of powdered gum arabic and sugar of milk may be mixed with one part of the powdered seeds, and divided into doses of twenty-five grains each, which may be repeated every two or three hours. Dr. Turnbull, of Liverpool, uses the following tincture and extract: Take of well bruised seeds of Phellandrium, sixteen ounces; alcohol, a sufficient quantity to displace by percolation thirty-two fluidounces. The dose is from half a fluidrachm to a fluidrachm. For the alcoholic extract, take of the seeds of Phellandrium, bruised, sixteen ounces, alcohol three parts; displace by percolation, distill off two and a half pints of alcohol, and evaporate the remainder to the consistence of an extract. The dose is from three to five grains, in the form of pill. He recommends it highly in consumption and bronchitis, to relieve troublesome cough, render expectoration smaller and easier, and produce sleep at night. He thinks the above preparations, contain the whole of the beneficial properties of the seeds, and act with more certainty and power.

ŒNOTHERA BIENNIS.

Tree Primrose.

Nat. Ord.—Onagraceæ. *Sex. Syst.*—Octandria Monogynia.

THE BARK AND TWIGS.

Description.—This is an indigenous, biennial plant, with an erect, rough, hirsute, and branching stem, from two to five feet high. The *leaves* are ovate-lanceolate, alternate, acute, obscurely toothed, roughly pubescent, from three to six inches long by half an inch to an inch and a half broad, those on the stem sessile, and the radicals tapering into a petiole. The *flowers* are numerous, pale-yellow, sessile, odorous, and are disposed in a terminal, somewhat leafy spike; they are nocturnal, open but once by night, and continue only a single day. The *calyx tube* is two or three times longer than the ovary, deciduous, four lobes, reflexed. The *petals* are four, equal, obcordate, or obovate, inserted into the top of the tube. *Stamens* eight, a little shorter than the petals. *Anthers* mostly linear. *Capsule* oblong, somewhat tapering above, four-celled, four-valved. *Seeds* numerous, naked, arranged in two rows in each cell—*G.*—*W.*

History.—Tree Primrose grows throughout the country in fields and waste places, flowering in July and August. There are several varieties of it, as *Œ. muricata*, *Œ. Grandiflora*, *Œ. Parviflora*, *Œ. Cruciata*, etc. When growing in retired isolated places, a white substance appears on the leaves, rendering them apparently very downy. By cultivating the plant, its flowers improve, growing much larger, and acquiring a darker hue. Each flower opens at the dusk of evening, and does not close till about nine or ten o'clock of the next morning, after which they do not open again. Pursh remarks that he has "frequently observed a singularity in this plant, and it might be interesting to make further inquiry into its cause; it is that in a dark night, when no objects can be distinguished at an inconsiderable distance, this plant, when in full flower, can be seen at a great distance, having a bright white appearance, which probably may arise from some phosphoric properties of the flowers." The bark, leaves, and twigs are the parts used; their taste is very viscid, with a subsequent slight acrimony, which last is diminished by desiccation. Water takes up the properties of the plant.

Properties and Uses.—An ointment made by boiling the twigs, leaves, and bark, in lard or tallow,—or a strong decoction of these,—has been found very efficacious in curing tetter, milk-scall, and other cutaneous affections of infants. These should be collected when the plant is in flower. In fomentation, or when recent, bruised, the leaves form an excellent application to ulcers.

OLEA.

Oils.

The term *Oil* is applied to a number of unctuous liquid or solid bodies, which, when placed upon paper, render it translucent, or impart to it what is called a greasy stain. Chemists have divided them into two classes, namely, *fixed oils*, and *volatile* or *essential oils.*

The *fixed oils* (Olea Fixa), also called *fatty oils*, and *animal oils*, are obtained partly from animals and partly from vegetables, by simple expression, and are distinguished by the following characters, viz.: they have an unctuous feel; are liquid, or readily become so when exposed to a gentle heat; are very combustible; have a mild taste; are insoluble in water, and nearly so in alcohol; leave a greasy stain upon paper; and their boiling point is not under 600° F. Among vegetables fixed oils are found in the greatest abundance in the seeds of dicotyledonous plants. They are usually obtained by subjecting the seeds or other bodies containing them to powerful pressure, after having bruised and gently heated them, that the oil may flow more freely. Sometimes, the articles are boiled in water, and the oil removed as it comes to the surface. Fixed oils have a certain degree of viscidity, causing them to adhere to the sides of the vessels containing them; they are never perfectly transparent, being generally colored, and mostly yellowish or greenish, but which may be removed by means of animal charcoal. When fresh they have little or no taste or odor. They differ greatly in specific gravity, which varies from 0.8795 to 0.968, but are lighter than water. They do not commence evaporation till heated above 212°, and do not boil until the temperature be raised to nearly 600°, at which they distill over, somewhat altered in their character, and in this state were formerly termed *philosophical oils.* A heavy inflammable air is obtained during their destructive distillation, formed of olefiant gas, marsh gas, and several carbohydrogens. At the boiling point the vapor given off consists of sebacic, margaric, oleic and other acids, and an empyreumatic oil, which may be procured by condensation of the vapor. When exposed to the influence of cold, fixed oils solidify; but the point of solidification varies in different oils. When in the state of vapor they take fire on the approach of an ignited body, and burn with a yellowish-white flame, the only new products resulting being water and carbonic acid. It is upon this principle that lamps and candles burn. When exposed to the air, fixed oils absorb its oxygen, become more and more viscid, and finally become solid: but when kept confined in well closed vessels, they preserve their properties for a long time. When the fixed oils have become solidified by exposure to the air, or to oxygen gas, they present characters differing from each other, and which has given rise to their division into *drying oils*, and *fat oils.* The drying oils become transparent, deeper colored, with a degree of toughness and ductility, and lose nearly, if not quite all of their unctuous quality. They contain much olein. Of this kind are the oils obtained from linseed, walnut, hemp, poppy, castor bean, croton tiglium, grape-seed, nightshade, tobacco, henbane, sunflower, and cress, and various other plants; and these drying oils when prepared by heat, etc., are much used by painters for varnishes, printers' ink, etc. The *fat oils* become opaque, with the appearance of wax or tallow. By keeping, fixed oils are liable to become thick, dark-colored, with a disagreeable odor, and an acrid taste, which changes are characterized by the name of *rancidity;* this change is more apt to occur with those oils containing mucilage or similar foreign matters. Agitation with water will partially diminish this tendency, also agitation with alkaline solutions or quicklime, likewise boiling the oil with water and hydrate of magnesia. The fixed oils are not dissolved by water, rendering that fluid milky when agitated with it, but the oil finally rises upon the surface; if a mucilaginous substance be added, the oil is prevented from rising, and a permanent milky mixture is formed called an *emulsion.* Most of the fixed oils are nearly insoluble in alcohol; olive or almond oil is hardly acted on at all, while linseed oil is more soluble, and castor oil is dissolved in any quantity. They are generally more soluble in ether. They readily unite with each other, with volatile oils, and likewise with bituminous and resinous substances. They form compounds with the alkalies, called *soaps,* and with the earths *insoluble soaps.* When hot, fixed oils are good solvents of iodine, chlorine, phosphorus, and sulphur; the first two, however, immediately become converted into hydriodic and hydrochloric acids respectively, and reacting on the oils impart to them the solidity of wax. Concentrated sulphuric acid added to fixed oils, forms olein and margarin, with sulpholeic acid, and sulphomargaric acid. Nitrous acid converts their olein into elaidin; the drying oils are, however, exempt from this change, not being affected by nitrous acid. Nitric acid changes the non-drying oils into suberic and numerous volatile acids. In small quantity sulphuric or hydrochloric acid forms a thick, viscid matter with fixed oils which are soluble in water, forming a lather with it. Nitric acid poured suddenly on the drying oils, sets them on fire. The principal fat oils are olive oil, almond, rape, mustard, plumb, beech, hazel, oil of ants, eggs, whale oil, sperm oil; the solid fat oils are, chiefly cacao butter, palm oil, Muscat balsam, laurel oil, Japan wax, bayberry wax, beeswax, cocoa oil, butter of galam, hogs' lard, common butter, and tallow. They are mostly composed of two different substances, the one a fluid called *olein,* and the other a solid called *margarin.* There are also other principles, as stearin, cetin, phocenin, etc. Fixed oils are dissolved in boiling alcohol, and as the fluid cools margarin is deposited; by evaporating the alcohol from the supernatant fluid, the olein is procured, or, the olein may be procured from tallow or fats by subjecting these to pressure between folds of blotting paper. The paper imbibes the olein, leaving the solid principle untouched; by soaking the paper in water, and subjecting it to pressure, the olein is forced out. *Olein* (in addition to what has been said under *Adeps*), is transparent, of a sweetish taste, neutral to test paper, and when heated yields *Acrolein*, *oleic* and other acids. *Margarin* is more soluble in boiling than cold alcohol, and dissolves readily in spirits of turpentine and cold ether. (*For the mode of obtaining stearin, margarin, and olein, see Adeps.*) When olein or olive oil is acted upon by nitrous acid, a dark-yellow buttery substance is the result, and when this is dissolved in hot alcohol, a small quantity of a reddish oil is taken up, and a white substance is left, termed *elaidin*, or the *elaidinate of glycyl.* This melts at 97°, is dissolved by ether in every proportion, requires 2,000 times its weight of boiling alcohol, sp. gr. 0.8975, to dissolve it, which solution becomes turbid on cooling; it is composed of glycerin and elaidic acid, which may be separated by the addition of an alkali, which forms a soap with the acid, leaving the glycerin behind. The other constituents of fixed oils, as olein, margarin, stearin, etc., are supposed to be mixtures of glycerin with the respective acids corresponding to the above names, as oleic, margaric, etc., acids, which may be obtained separately in the same way as named above to separate the constituents of elaidin. Fixed oils have the same ultimate composition, viz.: carbon, hydrogen, and oxygen, the hydrogen being in greater quantity than is required for the formation of water with the oxygen. They all appear to absorb oxygen. According to Berzelius, the oils which contain a large proportion of carbon, and but little oxygen, do not melt so readily as others; and M. de Saussure states that the more oxygen they contain, the more readily are they dissolved in alcohol. It is said that some fixed oils hold a very small amount of nitrogen, but this is probably an error in analysis, the nitrogen depending upon a minute quantity of albuminous matter in the oil, or, perhaps, the absorption of a minute quantity of azote from the atmosphere.—*T.*—*G.*—*Tur.*

Pelouze and Boudet suggest that margarin and stearin, when perfectly pure, are identical; and that the difference between them, as to their melting points, is due to determinate proportions of olein combined with each. They also state that there are two dissimilar sorts of olein, one of which is present in fat oils, the other in drying oils. One forms elaïdin with nitrous acid, while the other, which has the least hydrogen in its composition, continues in the fluid state when acted upon by this acid. The oleic acid prepared from them is also dissimilar, as the one becomes elaïdic acid by the action of nitrous acid, but not the other.

The following method of detecting the adulteration of oils is by F. G. Calvert, Esq., who after a series of experiments obtained the following satisfactory results: "As the reactions presented by the various oils depend upon the special strength and purity of the reagents, not only should great care be taken in their preparation, but also in the exact mode and time required for the chemical action to become apparent."

"*Solution of Caustic Soda, sp. gr.* 1.340, is chiefly useful to distinguish fish from other animal and vegetable oils, owing to the distinct red color which the former assumes, enabling one to detect the presence of one per cent. of fish oil. One volume of the test to be added to five volumes of the oil, well mixed, and heated to the boiling point. Hempseed oil acquires a brown-yellow color, and becomes so thick that the vessel which contains it may be inverted without losing any of its contents, while linseed oil assumes a much brighter yellow color, and remains fluid. India-nut oil is characterized by giving a white mass, becoming solid in five minutes after the addition of alkali, which is also the case with gallipoli, and pale rape oils, while the other oils remain fluid.

"*Sulphuric acid of sp. gr.* 1.475, will detect oils adulterated by hempseed and linseed oil, to the amount of ten per cent.; fish oils may also be detected to the amount of one per cent., the red color being noticed more particularly on their being allowed to separate by standing. Agitate one volume of the test with five volumes of the oil, and then allow the mixture to stand for fifteen minutes.

"*Sulphuric acid of sp. gr.* 1.530, one volume agitated with five of oil, and allowed to stand five minutes. Used for the detection of hemp, linseed, fish, gallipoli, and French-nut oils, as these only assume a decided coloration.

"*Sulphuric acid of sp. gr.* 1.635, used similar to the preceding, and the coloration noted after two minutes. The colorations are distinct and well marked; ten per cent. of rapeseed oil in olive oil, of lard oil in poppy oil, of French-nut oil in olive oil, and of fish oil in Neat's-foot oil, have been detected. A strength of acid above this carbonizes the oils and destroys the coloration.

"*Nitric acid of sp. gr.* 1.180, detects ten per cent. of hempseed oil in linseed oil; one part of the test to be agitated with five of the suspected oil, and allowed to stand five minutes.

"*Nitric acid of sp. gr.* 1.220, will detect the presence of hempseed, sesame, French nut, poppy and seal oils, in the proportion of ten per cent. The proportion of acid used, and the time of contact were the same as in the preceding case.

"*Nitric acid of sp. gr.* 1.330, used as above. This will detect ten per cent. of sesame, or French-nut oil in olive oil, but not the same proportion of poppy, as the color is not so intense; but any doubts as to whether it is poppy or the others, can be determined by the succeeding test, which renders French-nut oil a fibrous semi-saponified red mass, sesame a fluid one with a red liquor beneath, and poppy a fluid mass floating on a colorless liquor. The successive application of *nitric acid sp. gr.* 1.330, and of *caustic soda sp. gr.* 1.340, can also be successfully applied to detect the following very frequent cases of adulteration: 1st. That of gallipoli with fish oils, as gallipoli oil assumes no distinct color with the acid, and gives with soda a mass of fibrous consistency, while fish oils are colored red, and become mucilaginous with the alkali. 2d. That of castor oil with poppy oil, as the former, if adulterated, acquires a reddish tinge, and the mass with the alkali loses much of its fibrous appearance. 3d. Rapeseed oil with French-nut oil,—as nitric acid imparts to the former, when thus adulterated, a more or less intense red tinge, which an addition of the alkali increases, and renders the semi-saponified mass more fibrous.

"*Caustic soda of sp. gr.* 1.340, ten volumes to be added to the five volumes of oil just acted upon by one part of the preceding nitric acid test. In addition to the reactions named above, the following adulterations may be noted,—neat's-foot with rape, gallipoli with poppy, castor with poppy, hempseed with linseed, sperm with French-nut, and gallipoli with French-nut. The brown liquor on which the semi-saponified mass of sesame oil swims, is a very delicate and characteristic reaction.

"*Phosphoric acid;* one part by measure of syrupy trihydrated phosphoric acid agitated with five parts of oil, imparts a dark red color to the fish oils which rapidly becomes black; so that one part of these oils in 1,000 of any other animal or vegetable oils may be detected.

"*Sulphuric acid of sp. gr.* 1.845, *mixed with nitric acid of sp. gr.* 1.330, *equal volumes of each.* One part of this test to be mixed with five parts of the suspected oil, and the mixture allowed to stand two minutes. The adulterations of olive, poppy, and French-nut oils are readily detected. When a green color is produced allow the mixture to stand for ten minutes, in order to obtain the ultimate brownish-red color of the sesame oil, if this be present.

"*Aqua regia*, or *hydrochloric acid of sp. gr.* 1.155, twenty-five volumes mixed with *nitric acid of sp. gr.* 1.330, one volume, and allowed to stand about five hours. One volume of this test to be agitated with five volumes of oil, and allowed to stand five minutes. When the results of this test are compared with those of the preceding ones, we are struck with their uniformity, and are led to infer that no marked action had taken place; but this conclusion is erroneous, as most of them assume a vivid and distinct coloration, on the addition of *solution of soda sp. gr.* 1.340 (after the action of the aqua regia), as seen in the table on the column next to that marked for the action of aqua regia, so that ten per cent. of a given oil can readily be discovered; as poppy in rape, olive in gallipoli and Indian-nut, as all of them assume a pale rose color; but when poppy is mixed with olive or castor oils, there is a decrease in the consistency of the semi-saponified matter. By the aid of the above reagents we can also ascertain the presence of ten per cent. of French-nut in olive or linseed oils, as the semi-saponified mass becomes the more fluid, and the presence of French-nut in pale rape, gallipoli, or India-nut oils, is recognized in consequence of their white mass acquiring an orange hue; linseed oil is detected in hempseed oil, as it renders the fibrous mass of the latter more mucilaginous. Sesame oil also gives with this reagent the same reaction as with nitric acid, and an alkali, and poppy oil is distinguished from all other oils, by giving, in this case, a semi-saponified mass of a beautiful rose color.

"To give an idea how the following table is to be used, I shall suppose a sample of rapeseed oil adulterated with one very difficult to discover. I first apply the caustic soda test, which, on giving a white mass, proves the absence of the fish oils, together with those of hempseed and linseed; and as no distinct reaction is produced by the sample of oil under examination when mixed with the three sulphuric, and nitric acid tests above mentioned, poppy and sesame oils are thrown out as they are reddened, neat's-foot oil, Indian-nut, castor, olive, and lard oils resting only in the scale of probability. In order to discover which of these is mixed with the suspected oil, I agitate a portion of it first with nitric acid sp. gr. 1.300, and then with caustic soda, as the sample of oil does not give a fluid semi-saponified mass. The absence of olive oil is proved by no green coloration being obtained on the application of syrupy phosphoric acid. As to the presence of lard oil, it is ascertained on caustic soda being added to the oil which has been previously acted on by aqua regia, as the rape seed oil gives a fibrous yellowish semi-saponified mass, while the lard oil yields a pink fluid one."

In the table on the following page, in which the preceding facts are shown at a glance, the dots (......) mean "not colored."

VOLATILE, ESSENTIAL, or DISTILLED OILS (*Olea Volatilia*), are obtained from leaves, flowers, roots, barks, and indeed all parts of plants, but seldom in every part of the same plant. They are not, however, found in the cotyledons of seeds. In a certain class of plants, as the odoriferous *laminaceæ* volatile oil can be procured from almost every part of them. At times, it happens that the same plant furnishes several distinct oils; thus in the orange-tree, the rind of the fruit furnishes one kind of essential oil, the leaves a second, and the flowers a third, each of these oils being different from the others. Again, some volatile oils do not exist already formed in the plant, but are produced during distillation, by chemical reactions and influences. The greater part of plants contain their oil in minute, isolated little cells or vesicles, which is so well enveloped by its covering, that even after the plant has been dried, it may be obtained by expression or distillation. With many plants, and especially among their flowers, the oil is formed upon their surfaces, and evaporates as soon as it is developed. Most volatile oils are procured by distilling. the odoriferous part of the plant with water; some are obtained by expression; and others, which are not confined in little cells, as those of the jasmine, violet, etc., are obtained by macerating the flowers for a time, in an odorless fixed oil, well known to perfumers by the name of "oil of ben."

Volatile oils are characterized by, 1, their liquid condition, being often almost as liquid as water;—occasionally viscid or solid; 2, their great combustibility, burning with a brilliant flame, and much smoke; 3, their hot, pungent and acrid taste, and strong penetrating odor, partaking of that of the plants furnishing them, but more powerful; 4, their volatility

GENERAL TABLE OF REACTIONS.

OILS.	Caustic Soda, Sp. gr. 1.340.	Sulphuric Acid, Sp. gr. 1.475.	Sulphuric Acid, Sp. gr. 1.530.	Sulphuric Acid, Sp. gr. 1.635.	Nitric Acid, Sp. gr. 1.180	Nitric Acid, Sp. gr. 1.220.	Nitrid Acid, Sp. gr. 1.330. +	Caustic Soda, Sp. gr. 1.340.	Phosphoric Acid syrupy.	Suphuric Acid+ Nitric Acid.	Aqua Regia +	Caustic Soda, Sp. gr. 1.340.
OLIVE	Slight yellow	Green tinge	Greenish white	Light green	Greenish	Greenish	Greenish	Fluid white mass	Slight green	Orange yellow	......	Fluid white mass
GALLIPOLI	ditto	ditto	Gray	Brown	ditto	ditto	ditto	Fibrous ditto	ditto	Dark brown	......	Fibrous yellowish white mass
INDIA NUT.........	Thick and white	......	Dirty white	Light brown	......	......	......	ditto	......	Orange white	......	Fibrous white mass
PALE RAPESEED.	Dirty yellowish white	......	Pink	Brown	......	......	......	Fluid ditto	......	Dark brown	......	Fibrous yellowish white mass
POPPY	ditto	......	Dirty white	......	......	Orange yellow	Red	Light red fluid mass	......	Slight yellow	......	Fluid intense rose-colored mass
FRENCH NUT......	ditto	Brownish	Gray	Brown	Yellow	Red	Dark Red	Fibrous red mass	Brown yellow	Dark brown	Yellow	Fibrous orange mass
SESAME	ditto	Green tinge	Greenish dirty white	......	Orange yellow	ditto	ditto	Fluid red mass, with brown liquor beneath	......	Green, becoming intense red	ditto	Fluid orange mass with brown liquor beneath
CASTOR	White	......	Dirty white	......	......	......	......	Fibrous white mass	......	Brownish red	......	Fibrous pale rose colored mass
HEMPSEED.........	Thick brownish yellow	Intense green	Intense Green	Intense green	Dirty green	Greenish dirty brown	Greenish dirty brown	Fibrous light brown mass	Green	Green, becoming black	Green	Fibrous light-brown mass
LINSEED............	Fluid yellow	Green	Dirty Green	Green	Yellow	Yellow	Green, becoming brown	Fluid yellow mass	Brown yellow green	ditto	Greenish yellow	Fluid orange mass
LARD	Pinkish white	Dirty white	Dirty white	Light brown	......	......	Very slight yellow	Fluid mass	......	Brown	......	Fluid pink mass
NEAT'S-FOOT......	Dirty yellowish white	Yellow tinge	Brownish dirty white	Brown	Light yellow	Light yellow	Light brown	Fibrous white mass	......	Dark brown	Slight yellow	Fibrous brownish yellow mass
SPERM............	Dark red	Light red	Red	Intense brown	Slight yellow	ditto	Red	Fluid mass	Dark Red	ditto	ditto	Fluid orange yellow mass
SEAL	ditto	ditto	ditto	ditto	Pink	Light red	ditto	ditto	ditto	ditto	ditto	ditto
CODLIVER...	ditto	Purple	Purple	ditto	......	......	ditto	ditto	ditto	ditto	yellow	ditto

with boiling water, although their own boiling point varies from 312° to 325° F.; 5, their slight solubility in water, and ready solubility in ether, alcohol, or fixed oils; and 6, by their evaporating when placed on paper, without leaving any stain, and which is an easy test to detect their adulteration with fixed oils.

When properly rectified, volatile oils are mostly colorless, but as met with in commerce, some are brown, some yellow, some blue, some green, and others which are at first colorless, acquire a brown or yellow color by age. The greater number of them are very fluid, many indeed are as limpid as water, presenting no oily appearance, unless age and exposure has effected a change in them; others present an oily viscidity; and several acquire a degree of solidity, as the oils of fennel, anise, balm, etc. most of them congeal at different temperatures. With a few exceptions, they are lighter than water, their specific gravities ranging between 0.750 and 1.098. When heated in the open air, they readily evaporate without decomposition, diffusing their peculiar fragrance all around; and, with some, this is produced even at the common temperatures. They are not very susceptible of assuming the gaseous form, unless water, or some other substance be present; and when distilled alone, they lose their odor, become darker in color, and are partially decomposed. In contact with air, or oxygen, which they absorb, they gradually become deeper-colored, acquire more and more viscidity, gradually lose their odor, and are eventually oxidized and changed into acids, or resins. Carbonic-acid gas is evolved during the absorption of oxygen, but no water is produced. The different oils vary as regards their degree of absorption of oxygen, which action is much augmented by the influence of light. Dr. J. L. Plummer has found many of the essential oils to possess bleaching or decolorizing properties; whether this is actually the case is not yet satisfactorily ascertained, as it is probable that the bleaching power was due to some principles produced by the influence of light and air. Faraday has stated that "essential oils are thickened by long exposure to light and air; they become *ozonized*, and their properties changed." Volatile oils when shaken with water give to it a milky appearance; but on allowing the mixture to rest, they disengage and float upon the surface of the water, if lighter than this fluid, having communicated to it their peculiar aroma. They dissolve more readily in water by trituration with sugar, carbonate of magnesia, or calcined magnesia. The water from which they are distilled is always more or less flavored with their properties. Resins, fixed oils, camphor, some of the vegetable-alkaloids, and various other organic matters are soluble in the volatile oils. By the aid of heat they dissolve sulphur; a portion of which crystallizes on cooling; when digested with sulphur at the temperature at which the sulphur melts, they dissolve a portion of it, acquire a brown color, and a disagreeable taste and odor, and form what are called *balsams of sulphur*. When these balsams are strongly heated, gas is evolved rapidly, and violent explosions are apt to ensue. In a digesting heat, volatile oils dissolve phosphorus; but most of them deposit it as the solution cools; the solution may, however, be rendered permanent, by previously triturating one part of the phosphorus with ten parts of camphor. Chlorine, bromine, iodine, cyanogen, and fluorine, are absorbed, and change these oils into resins, by removing their hydrogen; the first three, very rarely, form combinations with the oils. Many vegetable acids combine with volatile oils, while the concentrated mineral acids decompose them. Alkalies and earths act but feebly upon the volatile oils, so that the only service they render in making soap is to give a perfume to it; these oils appear to combine with alkalies and earths, only when united to oxygen, so as to form resins. Various salts and oxides of metals which part readily with their oxygen, form resins with volatile oils.

Volatile oils are divided into three classes, viz.: those whose ultimate constituents are only carbon and hydrogen; those consisting of carbon, hydrogen, and oxygen; and those in which sulphur enters as a constituent. In some of the oxygenated oils a small portion of nitrogen has been found, but this is more than likely an impurity. Most of the volatile oils are composed of two oils or principles, both liquid and possessing different degrees of volatility; or, one liquid and the other hard at an ordinary temperature. They are called *Stearoptene* and *Eleoptene*. *Stearoptene*, or the "camphor" of the oil or plant, as it is frequently termed, is often found as a deposit at the bottom of many essential oils which have remained undisturbed for a long time; and not unfrequently, it may be procured artificially, by keeping the oils exposed to the direct action of water. Stearoptene may be separated from the Eleoptene by exposing the oils to a temperature which will solidify it, and then press it between layers of bibulous paper, which absorbs the fluid-principle, leaving the solid Stearoptene between the layers of paper. The Eleoptene may be obtained by placing the paper which has absorbed it, in water, and distilling. Should both principles be fluid, by the application of a proper degree of temperature, the one may be separated from the other.

The fluid oils are generally carbo-hydrogens, and the solid oxygenated, with, perhaps, the exception of oils of camphor, and lavender. One great difference between fixed and volatile oils is, that the former contain more oxygen and but little carbon, while the latter are rich in carbon, containing little if any oxygen, and a few of them, as oils of horseradish, mustard, etc., have a small proportion of sulphur as one of their constituent principles. The quantity of hydrogen will also be found to vary, the volatile oils, more commonly, containing it in greater abundance than the fixed. Carbon and nitrogen exist in the atmosphere, hydrogen in water, and sulphur in sulphates and sulphuric acid; these elements are abstracted from their original sources by the plants around which they exist, and by a process of assimilation are converted into the volatile oil of the plants. Stearoptene varies in its formation, being composed of carbon and hydrogen only, or, with the addition of oxygen; it is very readily reduced to a fluid state, and as a general rule rarely continues as a solid body above a temperature of 66° to 70° F. Volatile oils are frequently adulterated. As previously remarked, a pure volatile oil dropped upon a clean piece of writing-paper, leaves no greasy stain after its evaporation; if a stain is left behind, the oil is not pure, but contains *fixed oil.* Volatile oils are completely soluble in alcohol, but if they contain *resin* or *fixed oil*, the solution will be incomplete. If the oil be placed in water and distilled, all the volatile oil passes over, but the above impurities remain in the retort. *Alcohol* is sometimes added as an adulteration, to detect which various methods have been recommended. M. Beral drops in a thoroughly dried shallow glass-vessel ten or fifteen drops of the volatile oil to be examined, and then a very small piece of potassium is added (about half the size of a colchicum-seed); if no change occurs in the potassium after a quarter of an hour has passed, the oil is not adulterated with alcohol, or if it be, it does not exceed three or four per cent. If there be more than this amount of alcohol present, the potassium will pass away in a degree of time proportioned to the per cent. of alcohol present. Borsarelli proposes chloride of calcium as a test for the presence of alcohol. Pieces of perfectly dry chloride of calcium are placed in a long test-tube, which is filled with the suspected oil to nearly three-fourths its length, and then with agitation every now and then, the tube is heated to the boiling-point of water. In pure oils the chloride of calcium remains unaltered; when but little alcohol has been mixed with them, the pieces change, at least with regard to their form, and form a white, adhesive deposit; if a large amount of alcohol be present, it dissolves the pieces, and the solution forms a liquid stratum at the bottom of the vessel.—*Archiv. der Pharm., XXIV.*

J. J. Bernoulli adds dry acetate of potassa to the oil; if alcohol be present the salt is dissolved, forming a solution from which the volatile oil separates. If the oil be free from alcohol, the salt remains dry therein. Wittstein, who speaks highly of this test, has suggested the following mode of applying it as the best: in a dry test-tube, about half an inch in diameter, and five or six inches long, put not more than eight grains of powdered dry acetate of potassa; then fill the tube two-thirds full with the volatile oil to be examined. The contents of the tube must be well-stirred with a glass-rod, taking care not to allow the salt to rise above the oil; afterward set aside for a short time. If the salt be found at the bottom of the tube dry, it is evident that the oil contains no spirit. Oftentimes, instead of the dry salt, beneath the oil is found a clear syrupy fluid, which is a solution of the salt in the alcohol, with which the oil was mixed. When the oil contains only a little alcohol, a small portion of the solid salt will be found under the syrupy solution. Many oils frequently contain a trace of water, which does not materially interfere with this test, because, although the acetate of potassa becomes moist thereby, it still retains its pulverulent form. A. Oberdoffer places from two to four drachms of the suspected oil in a flat glass-plate, in the middle of which is placed a small glass-stand (the inverted neck of a six-ounce bottle is very suitable for this purpose) on which a watch-glass, with five to ten grains of platinum-black, is supported, and the whole covered with a glass-bell open at the top. After a strip of moistened litmus paper has been laid over the vessel containing the platinum-black, the operator observes the reaction. In the course of a few minutes, oil containing alcohol, begins to redden the litmus paper, which, in the space of a quarter or half an hour, is completely accomplished; upon which, the eliminated vapor of acetic acid is deposited on the interior of the glass bell if the alcohol was present in sufficient quantity, and can be recognized distinctly by its odor. To remove all doubt, he washes the platinum-black, after an hour has elapsed, with a little water, filters, saturates the filtrate carefully with potassa, and adds neutral chloride of iron, by which the characteristic color of acetate of iron is obtained; and, after boiling, the fluid becomes decolorized, and the hydrated oxide of iron is precipitated. From a series of experiments, he concludes that it is possible, in this way, to detect the presence of one to two per cent. of alcohol, and that with five per cent. the odor is sufficient, with most oils, to prove the admixture of alcohol. How far this method may be interfered with, by some oils which have very acid reactions, or particularly pungent odors, experience must teach; but with a great number of oils, it has been found available, even with oil of bitter almonds.

It frequently occurs that the higher-priced oils are adulterated with the cheaper kinds; the taste, odor, and specific gravity, will generally determine the adulteration. Oil of turpentine is a common adulteration, and may be known by its partial solubility when alcohol of sp. gr. 0.84 is agitated with one-fourth its volume of the suspected oil. One hundred parts of alcohol sp. gr. 0.84 dissolve 13.5 parts of oil of turpentine at 62° F. With the exception of the oil of rosemary, most volatile oils, when not adulterated with oil of turpentine, become milky-white, when shaken with an equal volume of poppy oil, which is not the case when they contain oil of turpentine.—*Jour. de Phar.*, 3*d. ser.*, *VII.*

When a fixed or volatile oil is adulterated by a cruciferous oil, M. Mailho has recommended the following as a sure test;—"Seven or eight of the suspected oils are boiled in a porcelain basin, with a solution of thirty grains of pure caustic-potassa in five drachms of distilled water. After boiling for a few minutes the whole is filtered, and the filtrate when tested with nitrate of silver, or acetate of lead paper, will speedily indicate the presence of sulphur. If, instead of a porcelain capsule, the oil is saponified in a silver vessel, the blackening of the latter speedily becomes visible. This test is very prompt and delicate, indicating the presence of the one-hundredth part of a cruciferous oil in any other oil."

G. S. Heppe has suggested the nitro-prusside of copper as a test for detecting oil of turpentine and volatile oils free from oxygen in oils which contain oxygen. A fragment of the nitro-prusside, of the size of a pin's head, is brought in contact with a small quantity of the oil to be tested in a test-tube; it is heated until the oil begins to boil, kept boiling for only a few seconds, and then allowed to settle. If the oil be an oxygenated oil free from turpentine, the nitro-prusside becomes black, brown, or gray, and the supernatant oil changes its color and usually appears darker. If the oil contains turpentine, the deposit is of a fine green, or bluish-green, and the supernatant oil colorless or slightly yellow.—*Am. Jour. Pharm., XXIX.*, 325. (*For Volatile Oils, see Part II.*)

TABLE OF SPECIFIC GRAVITIES OF FIXED AND VOLATILE OILS.

OILS.	TEMPER.	SPECIFIC GRAVITY	OILS.	TEMPER.	SPECIFIC GRAVITY.
Amygdalæ.........		.917 to .920	Menthæ Piperitæ		.902 to .920
do Amaræ....		1.043 to 1.084	Menthæ Viridis...		.914 to .975
Anethi..............		.881	Monardæ..........		
Anisi................		.976 to .990	Morrhuæ, pure...	72° F.	.917
Anthemidis........		.908	do pale.........	63° F.	.923
Bergamii...........		.885	do light-brown	"	.924
Cajuputi............		.914 to .927	do dark-brown	"	.929
Cari		.931 to .946	Myristicæ		.920 to .948
Caryophylli		1.034 to 1.061	Olivæ, pure........		.915
Chenopodii........		.908			Kane, } .... .867
Cinnamomi........		1.035	Origani.............		Lewis, } .... .940
Copaibæ............		.910			Brande, } .... .909
Cubebæ		.929	Pimentæ		1.021
Fœniculi...........		.997	Pulegii..............		.925 to .978
Gaultheriæ.........		1.173	Ricini................		.964
Hedeomæ..........		.948	Rosæ.................	90° F.	.832
Juniperi............		.911	Rosmarini, com..		.911
Lavandulæ, c'm...	68° F.	.898	do rectified....		.888
do rectified		.877	Rutæ.................		.837
do from the whole herb		.920	Sabinæ..............		.915
			Sassafras		1.094
Limonis, com......		.851	Succini, rectified.	75° F.	.758
do rectified..	71° F.	.847	Terebinthinæ......	72° F.	.86
Lini		.932	Valerianæ.........		.934

The above specific gravities are those usually given, yet they probably vary, according to circumstances; and unless otherwise named, the temperature of each is about 60° F.*

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* For these remarks on oils I am almost entirely indebted to Bell's Pharmaceutical Journal and Transactions, Thomson's Inorganic Chemistry, the Chemical Gazette, Archives de Pharm., Am. Jour. Pharm., Duncan's Edinburg Dispensatory, and Turner's Chemistry. M. Curieux purifies old resinified essential oils, by first forming a thin magma with solution of borax and animal charcoal; to this the oil is added and agitated for a quarter of an hour. At the end of this time the magma is found adhering to the sides of the bottle, while the essential oil flows limpid.

OLEUM BUBULUM.

Neat's-foot Oil.

THE OIL OBTAINED FROM THE FEET OF THE BOS DOMESTICUS.

Preparation.—Having removed the skin and hoof from ox feet, subject them to the long-continued action of water at 212° F.; the fatty matters which rise and float upon the surface must be skimmed off from time to time, placed into another portion of clear water, and the whole be heated to about 195° or 200° F. The oil again floats upon the surface, and must be taken therefrom. The oil may be still further purified, if necessary, by placing it in clean water, and subjecting it, for twenty or twenty-five hours to a temperature which will be just sufficient to isolate the oil from its fat; upon the cooling of the water, and after the solidification of the fat, the thin oil which remains should be passed through a coarse charcoal filter.

History.—Good Neat's-foot Oil has no smell, a mild taste, an oily feel, and is of a pale-yellowish color; as more commonly prepared, however, it retains both a disagreeable odor and taste. It does not readily solidify, remaining fluid at very low temperatures, and is used in machinery to lessen friction, likewise by saddlers and shoemakers, to soften and preserve leather and prevent its cracking.

Properties and Uses.—This oil is emollient and relaxant, and may be applied with advantage to the breast and throat, in croup or cough, rubbing it on with brisk friction. It likewise enters into various extemporaneous liniments and poultices. Dr. C. R. Hall, states in the London Jour. of Med. that he has used this oil in the place of cod-liver, in tuberculous diseases, and with much efficacy; the dose is the same as that of the cod-liver oil, and occasionally proves laxative. He found it especially useful among those patients with whom the fish oil occasioned nausea. The oil used was merely freed from foreign particles, of a yellowish-brown color, and thick and opaque with stearine, like honey not over clear.

OLEUM MORRHUÆ.

Cod-liver Oil.

A FIXED OIL OBTAINED FROM THE LIVERS OF CERTAIN FISH.

Description.—The common Cod-fish, *Gadus Morrhua* of Linnæus, and *Morrhua Vulgaris* of some other naturalists belongs to the *Class* Pisces, *Order* Malacopterygii Subbrachiata, and the *Family* of Gadoides. It is a fish two or three feet in length, having a gray back with yellowish spots, and a white abdomen. The body is somewhat flattened, and symmetrical; the ventral fins are pointed and placed under the throat. They have three dorsal, and two anal fins, and a cirrus or beard at the end of the snout. The teeth are pointed and unequal, and are disposed in several rows.

The large gills are seven rayed. On the external surface of the body are scales, rather soft, and not of large size. It is an inhabitant of cold or temperate seas, and is found in abundance on the coasts of Norway, in the neighborhood of Iceland, and in the waters of Newfoundland.

History.—Cod-liver Oil, as it is generally called in commerce, is obtained from several of the species of the genus Gadus—as the cod, coalfish and turbot, and sometimes from the pollock, hake, and haddock. The oil is obtained by several processes; one of which is to heat the livers with water, until they are formed into a semifluid substance; and then strain this into some vessel; the oil floats on the top of the filtered fluid, from which it is removed, strained, and put up for sale. A second plan is to place the livers in a vessel, heat them by passing steam around the exterior of the vessel, and then strain the semifluid mass as in the preceding process. In some places it is expressed from the livers. Again, it is obtained by the decay of the livers, after they have been placed in vessels; the oil ascends and floats upon the top, as it separates from the decomposing textures.—*Am. Jour. Pharm. XXIII.*, 97, *and XXVI.*, 1.

There are three kinds of Cod-liver Oil in commerce: First, the *white* or *pale-yellow*, which is obtained from recent livers, not tainted in the least, and varies in color from a very pale-yellow to golden-yellow. Its odor is not disagreeable, nor is its taste bitter, though it leaves in the throat a fishy somewhat acrid sensation; it has a very feeble acid reaction, a specific gravity 0.923 at 63°5 F.; is readily soluble in ether, while cold alcohol takes up from 2.5 to 2.7 per cent. of the oil, and hot alcohol from 3.5 to 4.5 per cent. 2nd, the *pale-brown* or *brownish-yellow*, is obtained from livers running gradually to putrefaction; it has a color somewhat resembling that of Malaga wine, an odor and taste similar to the above, a feebly acid reaction, and is readily dissolved in ether, while cold alcohol dissolves from 2.8 to 3.2 per cent. of it, and hot alcohol from 6.5 to 6.8 per cent. Its sp. gr. at 63°5 F. is 0.924. 3d, the *dark-brown* oil is prepared from livers in a state of decomposition; it is of a dark-brown color, transparent in thin layers, and greenish by transmitted light; its odor is empyreumatic and disagreeable, its taste bitter and empyreumatic, leaving an acrid sensation in the fauces, its reaction feebly acid, and its sp. gr. at 63°5 F. 0.929. Cold alcohol takes up from 5.9 to 6.5 per cent. of it; hot alcohol from 6.5 to 6.9 per cent.; and ether dissolves it readily.—*P.* These oils are generally of the consistence of sperm oil, having a taste and smell unlike those of any other oils, and which properties, in a great measure, are the best tests for the purity and authenticity of the oils. The taste as well as the odor very much resemble those of American shoe-leather, and when a distinct piscatory odor is present, like that of common fish-oil, we may doubt its purity.

According to an analysis made by Dr. De Jongh, the following principles were found in Cod-liver Oil, viz.: *gaduin*, oleic acid, margaric acid, glycerin, butyric acid, acetic acid, fellinic acid, cholic acid, bilifellinic acid, bilifulvin, iodine, chlorine, bromine, phosphoric acid, sulphuric acid, phosphorus, lime, magnesia, and soda. In relation to this analysis, Dr. F. L. Winckler observes: "Hence, therefore, its composition would be quite analogous to that of the other fatty oils; but with the addition of small quantities of some of the constituent parts of the bile, and also of iodine, bromine, and gaduin. But my own investigations have led me to regard Cod-liver Oil as an organic whole, of a peculiar chemical composition, differing from that of all other fatty oils hitherto employed as medicines. I prove this assertion by the following facts:—"

He here gives his series of experiments, as may be seen in Vol. II. of Bell's Pharmaceutical Journal, page 36, or, Am. Jour. Pharm., Vol. XXIV., p. 343, from which he draws the following conclusions:—

"Cod-liver Oil, when saponified with potassa, yields oleic and margaric acids, and oxide of propyle; with oxide of lead it forms oleic and margaric acids and a pure highly oxidized matter from propyle, namely, *propylic acid.* In neither case of saponification is the *hydrated oxide of glyceryle* obtained; the *glycerile* $C_6 H_3$ is replaced in Cod-liver Oil by *propyle* $C_6 H_7$. On heating the soaps of this oil with hydrate of lime and chloride of ammonium, a concentrated solution of *propylamine*$=C_6H_9$ N distills over. The generation of propylamine, on the addition of ammonia, takes place only in Cod-liver Oil, and in no other officinal fatty oil, and its place in the Materia Medica can not, therefore, be supplied by any other oil." He then continues, "It is not my intention to draw, from these investigations, any conclusion as to the medicinal efficacy of Cod-liver Oil. I am not a physician; but when we reflect that the fat assimilated by the animal organism serves chiefly as a material for the process of respiration, the possibility of Cod-liver Oil undergoing, during this process, a decomposition similar to that which it undergoes by the influence of alkalies, is very plausible; and when we further consider that in such a decomposition, by the presence of the conditions requisite for the formation of ammonia, which, indeed, are never wanting in the animal organism, the formation of propylamine is highly probable, it is not surprising why Cod-liver Oil alone should prove so advantageous in many diseases, even exclusive of the slight proportion of iodine; and I think myself justified in concluding that the efficacy of this oil depends chiefly upon the peculiar chemical composition which I have discovered; as propylamine, according to my experiment, is to be found also in the normal urine and sweat."

Cod-liver Oil is said to contain iodine, but in very minute proportion, hardly $\frac{1}{4}$ part in 500 parts of the oil, so that its medicinal virtues can not be at all owing to the presence of either iodine or bromine. Iodine can not be detected in it, until the oil has first been saponified, and then carbonized. As it becomes changed by exposure to the air, Cod-liver Oil should always be kept in pint or half-pint bottles, and be well secured with corks. Cod-liver Oil is liable to adulteration with several fixed oils, for the detection of which there are no tests on which implicit reliance can be placed. The shoe-leather flavor and odor, afford excellent criterions for judging of its purity, while on the other hand, a lamp-oil smell renders its purity of a doubtful nature. Concentrated nitric acid, when mixed and shaken with Cod-liver Oil, at once imparts a delicate rose tint to it, which soon changes to a fuscous color. (*See table and previous explanation on paje* 630.)

Dr. Jongh states that a few drops of concentrated sulphuric acid, change olive oil to a dirty gray color; oil of poppies to a deep-yellow inclining to brown; and ordinary fish oil to a deep-brown color; but when added, drop by drop, to Cod-liver Oil, a peculiar centrifugal movement is produced from the spot at which the drops fall, and at the same time a beautiful violet tint, which is instantly changed into purple by agitating the oil. This change of color is not owing to the presence of iodine, for other fish-oils which contain iodine do not manifest a similar change, but, as he believes, to the presence of a biliary principle called *Cholinic Acid.* This method, however, although it will distinguish the Cod-liver from every other oil, will not answer to distinguish its various adulterations with other fish or vegetable oils. The pure Cod-liver Oil contains in 100 parts from 0.020 to 0.030 parts of iodine, and oils containing a less proportion of this substance, are to be considered as adulterations or mixtures with non-remedial oils. Other oils, when mixed with iodine or various iodurets, may be readily detected by their yielding these articles to water or alcohol when agitated with them, while genuine Cod-liver Oil never gives up its iodine to these fluids. The genuine oil, when carbonized, without being first saponified, and the carbon then separated by means of alcohol, does not betray the least trace of iodine, while other oils treated in the same manner are invariably detected by manifesting the presence of iodine or any of the medicinal iodurets. Again, the genuine oil, when saponified, never communicates to the mother-water the slightest trace of iodine, while the contrary is the case when other oils combined with iodine, either in a free state or in any of its combinations, are subjected to saponification.

The color of the oil is of but little value as a test, though the pale or light brown variety is generally esteemed the most; it has not the nauseous and disgusting odor and flavor of the brown oil; and, probably, even could the brown oil be used with freedom and without nausea, it would, like other rancid and empyreumatic fats, derange the digestive functions, and be otherwise hurtful. In a paper read by Mr. Mercer before the Liverpool Chemists' Association, and published in Bell's Pharmaceutical Journal, Vol. XIV., p. 413, he makes the following remarks: "Though the historical notices of Cod-liver Oil are pretty numerous, and extend at irregular intervals over the last sixty years, most of our information is derived from the labors of De Jongh, who, a few years ago, paid considerable attention to the subject; and his analyses being quoted as the most correct which have yet been published, Mr. Mercer took them as the basis of his remarks. The first question that arises is, what constitutes the distinction between the three varieties of oil referred to? De Jongh quotes several authorities on this point, and the conclusion he arrives at from their testimony is, that 'the clear pale oil is obtained by the spontaneous flow from the putrescent livers, the brown by the boiling or roasting of livers, and the light-brown is a clear pale oil, which has stood long on the livers, or has got old in the warehouse.' The analyses of these three varieties show but little difference between them. They all contain about 96 per cent. oleic and margaric acids, and glycerin, constituents of all oils and fats. The remaining 4 per cent. is made up by small portions of butyric and acetic acids, the elements of the bile, iodine, bromine, etc. And the conclusion De Jongh draws from these analyses is that "the light brown and the pale oil agree in every respect much more than the brown; by which it is established that the light brown is only a pale oil which has become old." Proceeding in his investigations he tries their comparative medicinal value, and for this purpose selects three sets of six patients each, and much to Mr. Mercer's astonishment, he found that the palm of superiority was carried off, not by the light brown, which De Jongh now proclaims preferable to all others, but by the brown, obtained, as he tells us, by boiling or roasting the putrescent livers of the fish. This De Jongh accounts for by observing that according to his analyses, the brown oil contains a little more biliary matter and butyric acid than either of the others; it is, therefore, he says, "fair to assume that the brown oil owes its greater power to the biliary matter and butyric acid, which exist in it in much larger proportions than in the lighter colored oils." Yet, strange to say, by referring to his analyses, it will be seen that the pale brown oil he now recommends does not contain even a trace of butyric acid.

Altogether, De Jongh shows such a slight difference to exist between the chemical composition and medical effects of the three oils, that the question arises, Is it not possible that *he may have failed in discovering their active principles?* This Mr. Mercer believed to be the case; for while, according to his analyses, Cod-liver oil has apparently a constitution similar to all other fats and oils, with the addition of biliary matter and small quantities of inorganic salts, Winckler, a German chemist, has shown that so far from this being the case, it possesses a chemical composition differing from all other fatty oils hitherto employed in medicine; *a most important fact;* for, previous to these investigations of Winckler, it was considered that all oils consisted of fatty acids in combination with glycerine, the oxide of glyceryle; but in Cod-liver Oil he finds that glycerine is replaced by the oxide of propyle. The generation of propylamine, which is met with in the normal urine and sweat, takes place only in Cod-liver Oil on the addition of ammonia, and in no other officinal fatty oil; and its place in the Materia Medica can not therefore be supplied by any other oil. This discovery of Winckler's has not been questioned, and when we see that De Jongh failed to detect the presence of such an important substance as propyle, a characteristic which distinguished Cod-liver Oil from all other oils, *we can not place much confidence in the other results of his analysis.*" Mr. Mercer considered as the best medicinal oil that which was obtained from the liver in a state most nearly approaching that in which it exists in the fish when alive, being devoid of color, taste, and smell, the most valuable tests of its purity we are acquainted with. Mr. Lawson stated, that some Cod-liver Oil, which he had exposed to the light for some time, lost its power of giving the usual liver-oil reaction with sulphuric acid. M. Berthe states as the result of numerous researches, that a drop of concentrated sulphuric acid let fall upon some drops of pure Cod-liver Oil contained in a glass-plate, placed on a white sheet of paper, forms an areola of a most beautiful violet color, which soon passes into a crimson. After a few minutes, the mixture becomes brown, or brownish red. Pereira states that in some samples the red color is produced at once, without the preliminary violet tint.

Properties and Uses.—Cod-liver Oil is nutritive and alterative. It has been long used as a domestic remedy in chronic rheumatic and strumous diseases, especially in the northern parts of Europe, and has been in general medical use, only since the treatise upon it by Professor Bennett of Edinburgh, in 1841, although employed occasionally in the profession as early as 1766. The diseases in which it is said to be most efficient are chronic rheumatism, strumous diseases, enlargements of the glands, strumous ophthalmia, pseudo-syphilis, in scrofulous constitutions, various chronic cutaneous diseases, and even phthisis. Gout, caries, rachitis, and tabes mesenterica, have, it is said, yielded to its influence. It is also asserted to have been found useful in diseases of the joints and spine, lupus, obstinate constipation, worms, and incontinence of urine; and may be advantageously employed in all chronic cases, in which the disease appears to consist mainly in impaired digestion, assimilation and nutrition. Externally, used in opacities of the cornea, a drop or two placed on the cornea with a camel's-hair pencil, also in various chronic cutaneous diseases, rhagades, chaps, eczema, excoriations and fissures. Dose, half a fluidounce, twice a day, or more; but it is best to begin with small doses at first, say one drachm only, in order to lessen the risk of nausea and vomiting. Patients soon accustom themselves to its use, without repugnance. It is best given alone, followed by some claret, or a little sugar and cinnamon powder, or prepared with aromatic oils, the same as castor-oil, which see. Its use is contra-indicated in plethora, or where there is a strong tendency to it. When long used, it is said to frequently occasion an eruption on the surface of an eczematous character. But little advantage will be apparent from the administration of Cod-liver Oil, until its use has been persevered in for five or six weeks, though it often commences earlier. Whether it deserves all the encomiums passed upon it, or is as efficient an agent as stated, in the various forms of disease in which it has been recommended, is yet a matter of some uncertainty; time is required to fully and correctly ascertain its merits. Dr. Jongh prefers the darker colored oils; Mr. Wm. Bastick prepares a solution of quinia in Cod-liver Oil by adding anhydrous quinia, in fine powder, to the oil contained in a suitable vessel, and applying the heat of a water-bath until a clear solution is formed. The oil becomes darker as the quinia dissolves; any amount of this latter may be used; the proposed proportions are two grains to the ounce of salt. Messrs. S. J. Lyman & Co., state that an unpleasant flavor is communicated to the oil by the continued application of heat, and advise the previous solution of the quinia in alcohol of sp. gr. 0.796, which will require much less heat for its solution in the oil as the alcohol evaporates. The anhydrous quinia may be obtained by dissolving sulphate of quinia one ounce in boiling distilled water two pints, then add liquor ammoniæ in slight excess, and collect and carefully wash the precipitated quinia. Then dry it on filtering paper, and fuse it in a porcelain dish, in a sand-bath; it has a resinous appearance, translucent, dark-brown in color, and is soluble in fixed oils to almost any extent. As the quinia is slightly soluble in excess of liq. ammon. a solution of caustic soda might be advantageously used as a substitute for the former precipitant.

OLEUM OLIVÆ.

Olive Oil.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

OIL FROM THE PERICARP OF OLEA EUROPEA.

Description.—The Olive-tree is an evergreen, growing from twelve to twenty feet high, with hoary, rigid branches, and a grayish bark. The *leaves* are opposite, lanceolate, or ovate-lanceolate, mucronate, short-petioled, green above, hoary on the underside. The *flowers* are small, and are arranged in short, axillary, erect racemes, very much shorter than the leaves. The *corolla* is short, white, with four, broad, ovate segments. The *calyx* is short, four-toothed. *Stamens* two, rather projecting; *style* very short; *stigma* bifid, with emarginate segments. *Fruit* a drupe about the size of a damson, smooth, purple, two-celled, with a nauseous, bitter flesh, inclosing a sharp-pointed stone.—*L.*

History.—The native country of the Olive-tree is unknown, though it is supposed to have been originally from Asia; at present it is extensively cultivated in the south of Europe, especially in Spain, France, Sicily, Italy, Calabria, and Apulia. The tree commences yielding fruit in its third year; in its sixth year, it is very productive, and remains so for an indefinite length of time. More than one variety of the tree is recognized by botanists, which differ in magnitude, hue, taste of the fruit, and character of the foliage. The bark of the tree was formerly used in medicine, as well as the leaves; they have a bitter taste, with acrimony. In the warmer provinces of Europe a substance exudes from the bark, which has been called *Gomme d'Olivier*, and which, according to Pelletier, consists of a peculiar resin, a small quantity of benzoic acid, and a peculiar crystalline principle, which he called *Olivin* or *Olivile*. This was at one time used as a remedial agent. The fruit, gathered when not quite ripe, is very solid, bitter, and acrimonious; but when steeped for several days in a ley of wood-ashes, and then pickled in brine, it constitutes the olive of commerce, much valued by some as a dessert.

The only product of the tree which is officinal is the oil, obtained by expression from the fleshy pericarp of the fruit. The fruit is carefully collected immediately previous to its ripening, or when it assumes a reddish hue, one day usually completing the gathering; if the olives be collected when fully ripe, the tree will bear only every other year. Without delay, the drupes are passed through a mill, having its stones so arranged as not to break the olive-nuts; the pulpy mass thus obtained undergoes expression, from which the finest oil is procured, termed *Virgin Oil*. The mass which has been solidified by the pressure, is reduced to fragments, dampened with boiling water, and again exposed to pressure, thus yielding a second-rate oil, which may be used as a salad oil and for preparing fine soaps; it is the ordinary Olive Oil of commerce. Upon again breaking up the cake formed by the pressure, steeping it in water, allowing it to remain for ten or twelve days, until it begins to ferment, and then expressing it, an inferior oil is obtained, which is used in lamps, also for making plasters, inferior soaps, etc. Other varieties are introduced into the process in different countries. The finest oil comes from Provence and Florence, and sometimes from Genoa and Lucca; the commoner sort, termed Gallipoli Oil, comes from Naples. The best quality comes in clear glass bottles, or in Florence flasks—glass vessels, inclosed in a kind of wickerwork formed from the leaves of some plant. Fine Olive Oil is a greasy liquid of a pale yellow color, and frequently having a greenish tint; it is nearly odorless, and has a mild, faintly-sweet oleaginous taste. It will keep for a long time, without becoming rancid, especially when protected from the influence of light and air. Its specific gravity varies from 0.911 to 0.9192. At the temperature of 38° F., a considerable part of it solidifies in white crystalline grains, which are fatty bodies, composed of margarin principally, with a small proportion of olein; the supernatant fluid is olein. Olive Oil is not completely dissolved by alcohol, and requires one and a half times its weight of ether for solution. According to Braconnot it contains 72 parts of olein and 28 of margarin; its ultimate constituents are carbon, hydrogen, oxygen, and nitrogen.

Margarin may be obtained by squeezing the crystals which form at a temperature of about 20° in bibulous paper; the paper absorbs the olein, and leaves the concrete margarin. Few vegetable oils contain so large a proportion of this solid principle. Olive Oil is not a drying oil; it undergoes saponification when heated with alkaline solutions, freeing glycerin, and forming soluble salts, in which the alkali is combined with several fatty acids. Nitrous acid, or nitrate of mercury converts it into a fatty principle called elaidin, which concretes at temperatures below 97°, and is converted by saponification into glycerin and elaidic acid.

The action of the atmosphere greatly deteriorates the character of Olive Oil, as to consistency, color, odor and taste, producing rancidity, gummy viscidity, and a darker hue. It is very liable to adulteration with oils, which adulteration may be recognized by the fluidity of the oil at the freezing point. "M. Poutet shakes together three ounces of suspected oil with two drachms of protonitrate of mercury for two minutes. If the Olive Oil be pure, it thickens immediately, and next day is a concrete mass; but if it be adulterated with *poppy oil*, there is only a precipitate, and the quantity of supernatant fluid shows the degree of adulteration." According to Rousseau, Olive Oil conducts electricity 675 times more slowly than other oils; to ascertain which he used the *diagometer*, an instrument consisting of one of Zamboni's dry piles and a feebly-magnetized needle, moving freely on a pivot; the electricity developed by the pile produces a deviation in the direction of the needle; but when any substance is interposed between the needle and the pile, the deviation is less in proportion to the bad conducting power of the interposed substance. Since the manufacture of lard oil, it has been extensively used to adulterate Olive Oil, and large quantities of it are taken to Europe every year for this purpose.

Properties and Uses.—Olive or *Sweet* Oil, as it is often called, is emollient, nutritive, and aperient. A fluidounce or two purges, but is uncertain and often ineffective. As a demulcent it is useful in irritations of the mucous surfaces of the air-passages, and of the alimentary tube; it may be given as a gentle aperient in cases where other agents would cause too much intestinal irritation; and is of service as an antidote to the strong alkalies, in which it acts by combining with them to form soap. It has been used in cases of poisoning by cantharides, but owing to its readily dissolving their active principle, it increases the peril of the patient. As an article of diet it is exceedingly improper for dyspeptics. Rubbed over the whole surface of the body, it has been considered beneficial in the treatment of plague, scarlatina, and some other exanthematous affections. According to Mr. Sidney H. Maltass, a strong decoction of the leaves of the olive-tree, given in doses of a wineglassful every three hours, has cured the most obstinate and severe forms of intermittent fever. He considers it more effectual than quinia.

Off. Prep.—Emplastrum Plumbi; Emplastrum Plumbi Compositum; Emplastrum Resinæ Compositum; Linimentum Ammoniæ; Linimentum Nigrum; Unguentum Acidi Nitrici; Unguentum Cetacei; Unguentum Ipecacuanhæ; Unguentum Myricæ; Unguentum Plumbi Compositum.

OLEUM RICINI.

Castor Oil.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphia.

OIL OBTAINED FROM THE SEEDS OF RICINUS COMMUNIS.

Description.—Ricinus Communis, the *Castor Oil bush*, in the United States, is a herbaceous annual, with a white, frosted or glaucous, hollow, smooth *stem*, of a purplish-red color upward. The *root* is long, thick and fibrous. The *leaves* are large, alternate, deeply divided into seven or nine lanceolate segments, peltate, palmate, serrate, from four to twelve lines in diameter, and on long, tapering, purplish petioles. The *flowers* in long, green, and glaucous spikes, springing from the divisions of the branches; the males from the lower part of the spike, the females from the upper. The *capsule* is prickly, three-celled, three-seeded. The *seeds* are ovate, shining, black dotted with gray.—*L.*—*W.*

History.—Ricinus Communis, or *Palma Christi*, is an East Indian plant, in which country it attains the size of a tree. In the United States, where it has become naturalized, it seldom grows higher than eight or ten feet, flowers in July and August, and matures its seed in August and September. The fixed oil of the seeds is the Castor Oil of the shops. The seeds are about four lines in length, three lines in width, and about a line and a half in thickness, and consist of a smooth external coat, covering a thick, hard and dark brown shell, composed of two layers which enclose the white nucleus or oleaginous kernel, which has within it a large, dicotyledonous, leafy embryo. From its resemblance to the "dog-tick," the name Ricinus was probably derived. According to Geiger, the seeds are composed as follows: the *seed-coats* contain tasteless resin and extractive 1.91, brown gum 1.91, ligneous fiber 20.00 The *nucleus of the seeds* contain fatty oil 46.19, gum 2.40, casein (albumen) 0.50, ligneous fiber, with starch, 20.00, loss or moisture 7.09.—*P.* They must also contain a peculiar and acrid principle, which has not yet been obtained, for they are powerfully active after the oil has been expressed. The seeds soon acquire rancidity with irritating properties, and in this state should not be used for procuring the oil.

There are three modes by which Castor Oil is obtained, viz.: 1st, The seeds are deprived of their husks, steeped for a night in cold water, and then boiled for two hours in a fresh portion of water, dried in the sun and bruised, and lastly, boiled in fresh water, and constantly stirred, till all the oil separates and rises to the surface; this is removed by skimming, and boiled with a little water to remove the volatile acrid constituent. This plan is said to be pursued in both the East and West Indies; it is apt to furnish an irritating, acrimonious product, and a dark-colored oil; 2nd, The oil is sometimes obtained by the agency of alcohol, but the process is an expensive one, and the product is inferior, soon becoming foul;

3rd, The seeds, having been completely freed from all impurities, are introduced into an iron vessel of but little depth, and then exposed to a moderate degree of heat, sufficient to warm them through without roasting, and thus liquefy the oil that it may flow readily; then, by expression, the oil is obtained. This is subsequently boiled with a large proportion of water, to dissolve out the soluble impurities, and coagulate albumen, removing all foreign bodies as they float upon the liquid. The oil is separated from the water, boiled again in a small quantity of water, which purifies the oil by driving off its acrid constituent. About twenty-five per cent. of oil may thus be procured.

Castor Oil has a pale straw-yellow color, considerable unctuous viscidity, a faint sweetish taste, with some acridity, followed by nausea, and a repulsive odor. When pure it is colorless and almost inodorous. From want of care in its preparation, it sometimes becomes turbid on standing, or gives a precipitate of margarin, etc., so that it must be filtered through coarse filtering paper to render it fit for use. The most esteemed Castor Oil is the *cold drawn*, which is made by expression without heat. It is one of the heaviest of the fixed oils, having a density of .964 at 60°. When exposed to cold a little below 32°, it slowly becomes thick and turbid, and at length deposits a very few crystalline grains of margarin, though it is stated that no margarin separates, if the oil has been previously heated to 212°, either with or without water. At a temperature above 212° the oil itself becomes altered and acquires acrid properties. When in an open vessel, the action of the air renders it thick and rancid, without impairing its transparency; and eventually it dries up, and hence is called a *drying oil.* It is insoluble in water, soluble in all proportions in alcohol or ether, and even rectified alcohol of sp. gr. 0.840 takes up about a third of its volume—a property not possessed by any other common fixed oil except the concrete palm oil. It readily combines with other fixed as well as volatile oils; the alkaline solutions dissolve and saponify it, producing acids termed the *ricinic*, *ricinoleic*, *ricino-stearic.* Hyponitrous acid will convert twenty times its weight of Castor Oil in seven hours, into a firm, yellow, solid substance, called *Palmin*, which is saponifiable by alkalies, yielding *Palmic acid* and glycerin. Castor Oil, when added to other fixed oils, renders them more soluble in alcohol. It may be distilled at a temperature of about 510°, when it undergoes important alterations, yielding three acids, apparently identical with those above named. The proximate constitution of Castor Oil is imperfectly understood by chemists.

It is stated that rancid acrid Castor Oil may be deprived of its disagreeable odor and taste, as well as of its acrimony, by boiling it for fifteen minutes with water and a little calcined magnesia. If it be turbid, it should be clarified by filtration through coarse paper. Castor Oil is much employed in the preparation of an article which is extensively sold throughout the country for *bear's oil;* it is composed of four fluidounces of Castor Oil, mixed with two fluidrachms of an aqueous solution of salts of tartar (carbonate of potassa) and scented with bergamot, lavender, or other aromatic oil.

Properties and Uses.—The Castor Oil seed or bean is a powerful drastic cathartic and irritant, and has proved fatal to man when taken to the extent of twenty seeds at once. Yet the oil expressed from it is only a mild cathartic, operating promptly, producing thin, feculent, but not watery stools, causing but little griping or nausea. From its mildness of action, it is especially adapted to young children, pregnant or puerperal females, likewise in hemorrhoidal affections, colic, diarrhea, dysentery, enteritis, after the reduction of hernia, obstinate constipation, collections of indurated feces, accumulation of acrid secretions, and in worms. One part of oil of turpentine mixed with three or four parts of Castor Oil increases its purgative and anthelmintic effect. The greatest objections to this cathartic are its nauseous taste and its tendency to cause sickness or unconquerable disgust. This may by overcome by adding to one pint of the oil half a fluidounce each of oils of origanum and wintergreen, or one ounce of sassafras oil; the dose of this may be given in sweetened water. Any other aromatic oils will answer equally as well. When not contra-indicated it may be taken in wine, spirituous liquors, or the froth of porter, likewise in cinnamon or peppermint water. I find it a very pleasant mode of administration to boil the dose of oil with about a gill of good sweet milk for a few minutes, sweeten with loaf-sugar, and flavor with essence of cinnamon or other favorite aromatic; it somewhat resembles custard in its taste and appearance, and is readily taken by even the most delicate stomach. Stuncke states that Castor Oil saponifies readily with alkalies, and gives with soda a white solid soap, which, in the form of pills, is a certain and agreeable purgative. M. Parola proposes an ethero-alcoholic extract and the ethereal and alcoholic tinctures of the seeds, as a substitute for the oil; he states that the above tinctures have a purgative action four times as strong as the oil, are less irritating, and remain unalterable in all climates. As an enema, Castor Oil may be used in the quantity of two or three fluidounces, mixed with some mucilaginous liquid. Externally, it has been recommended in itch, ringworm, and other cutaneous diseases. Dose, for an adult, a fluid ounce or a fluidounce and a half; for an infant, one, two, or three fluidrachms, according to its age. Equal parts of Castor Oil and copal varnish, form an excellent local application for hemorrhoidal affections. A hairwash for keeping the hair from falling, and cleansing it of dandruff, is sold by the perfumers, and is made as follows: Take Castor Oil half a pound, strongest alcohol half a pint, powdered cantharides forty eight grains, oil of bergamot half an ounce, otto of roses four drops; mix, let them stand for seven days, frequently shaking, and then filter, and keep in well closed bottles.

We are informed by Dr. J. O. McWilliam that the natives of the Cape de Verd Islands, have common recourse to a remedy called "Bofareira," for the purpose of accelerating and increasing the flow of milk, not only from the breasts of childbearing women, where that secretion was tardy in appearing, or deficient in quantity when it did appear, but, on occasions of emergency, from the breasts of women who are not childbearing, or who have not given birth to, or suckled a child for many years. The leaves of the plant, bofareira, are used, and which proved to be on investigation, the "Ricinus Communis," or common Castor Oil plant. The *white* bofareira is used, and carefully selected from the *red* bofareira, which appears to be a variety of the same species, but which they say is a powerful irritant, producing an immediate and often immoderate menstrual discharge, as has resulted in cases where it has been occasionally used in mistake. The *white*, or that which possesses galactagogue qualities, is recognized by the natives by the light-green color of the stem of the leaf, while the leaf stem of the red is of a purplish-red hue.

In cases of childbirth, when the appearance of the milk is delayed (a circumstance of not unfrequent occurrence in those islands), a decoction is made by boiling well a handful of the white bofareira in six or eight pints of spring water. The breasts are bathed with this decoction for fifteen or twenty minutes. Part of the boiled leaves are then thinly spread over the breasts, and allowed to remain until all moisture has been removed from them by evaporation, and probably, in some measure, by absorption. This operation of fomenting with the decoction and applying the leaves, is repeated at short intervals until the milk flows upon suction by the child, which it usually does in the course of a few hours.

On occasions where milk is required to be produced in the breasts of women who have not given birth to, or suckled a child for years, the mode of treatment adopted, is as follows: two or three handfuls of the leaves of the Ricinus are taken and treated as before. The decoction is poured, while yet boiling, into a large vessel, over which the women sits so as to receive the vapor over her thighs and generative organs, clothes being carefully tucked around her so as to prevent the escape of the steam. In this position she remains for ten or twelve minutes, or until the decoction cooling a little, she is enabled to bathe the parts with it, which she does for fifteen or twenty minutes more. The breasts are then similarly bathed, and gently rubbed with the hands; and the leaves are afterward applied to them in the manner already described. These several operations are repeated three times during the first day. On the second day, the woman has her breasts bathed, the leaves applied, and the rubbing repeated three or four times. On the third day, the sitting over the steam, the rubbing, and the application of the leaves to, with the fomentation of, the breasts, are again had recourse to. A child is now put to the nipple, and in a majority of instances, it finds an abundant supply of milk. In the event of milk not being secreted on the third day, the same treatment is continued for another day, and if then there still be want of success, the case is abandoned, as the person is supposed not to be susceptible to the influence of the bofareira.

Women with well-developed breasts are most easily affected by it, while those with small and shriveled breasts have the uterine system acted upon, bringing on the menses, if their period be distant, or causing their immoderate flow if their advent be near. Exposure to cold is carefully avoided by women brought under its influence; they scrupulously abstain from wetting the hands or feet with cold water. It is said to affect virgins of adult age, similar to child-bearing women. It sometimes produces swelling and pain in the breasts and axillary glands, pain in the back, and an increase of a leucorrheal discharge.

This remedy, and the red bofareira, as an emmenagogue, both of which are common to this country, have been already tried by physicians, and the results have been sufficiently favorable to render further investigation very desirable.

Off. Prep.—Mistura Chenopodii Composita; Mistura Olei Composita.

OLEUM TEREBINTHINÆ.

Oil or Spirit of Turpentine.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

History.—Turpentine is the name usually given to those vegetable exudations, into which resin and a volatile oil, known by the name of "Oil of Turpentine" enter as prominent constituents. Turpentine is generally obtained from the juice of the yellow or pitch pine, Pinus palustris, as well as other pines, and the Abies balsamea, etc. Beside the turpentines from these trees, there are others, as the ordinary European Turpentine, *Terebinthina Vulgaris*, from the Pinus sylvestris; the larch or Venice Turpentine, *Terebinthina Veneta*, from the Larix Europea and Abies larix; the chian or cyprus Turpentine, *Terebinthina chia*, or *cypria*, from the Pistacia terebinthus; the Bordeaux Turpentine from the Pinus maritima, and many others. All the Turpentines are generally thick, of a molasses-like consistence, and a light-yellow or brownish color; some are translucent or transparent, others turbid or opaque, and they have a strong smell, *sui generis*, and a bitter, more or less disagreeable, terebinthine taste, with a degree of acrimony. Venice Turpentine is rather fluid, tenacious, of a greenish hue, a rather pleasant smell, and a hot, bitter, pungent taste. The Turpentines are readily soluble in ether or alcohol, and combine with the fatty oils. All the terebinthinate resins, etc., owe their medical properties to their volatile oil; they are seldom used at present, except in salves, plasters, etc.

Oil of Turpentine is procured by distilling Turpentine in the dry way, or with water; the former is apt to give an empyreumatic result, while by the latter process a very fine article is obtained. The residue in the still, after the distillation of the oil, is *rosin.* To purify the oil it should be mixed with caustic potassa in solution, and be again subjected to distillation.—*P. C.* The North Carolinians prepare this Oil on an extensive scale. The Oil, or Spirit of Turpentine, as it is often termed, is, when pure, a clear, transparent, very liquid fluid, resembling water, of a powerful, penetrating, balsamic, and, to most persons, disagreeable odor, and an unpleasant, peculiar, bitter, and sometimes acrid taste; it floats on water, being of the specific gravity 0.86 at about 70° F., is very volatile, boils at about 314° F., but as the boiling goes on the boiling point rises at least as high as 350° F., and the specific gravity of its vapor at 313° is 4.83. A cold of —17° F., causes it to deposit white crystals, which are a hydrate of the pure oil. It is very inflammable, burning with a fierce, dense, red flame, and much black smoke. In the open air it slowly attracts oxygen, becomes brown, somewhat denser and more tenacious, and its properties are considerably impaired; the oxygen converts it into resin, from which the oil may be separated by distillation. It is scarcely dissolved by water, partially so by alcohol, and wholly so by ether. It dissolves resins, fixed oils, fats, many alkaloids and neutral crystalline principles from the vegetable kingdom, and caoutchouc. When immersed in chlorine gas it inflames; and iodine dropped into it is partly dissolved, and partly dispersed with an explosion. It has a strong affinity for hydrochloric acid gas, forming with it, when surrounded by ice, a crystalline body, which from its similitude to camphor, has been named by Kind *artificial camphor*, and which consists of one equivalent, each, of hydrochloric acid, and the radical Oil of Turpentine (camphene), and is consequently a hydrochlorate of camphene. A red fluid compound is also obtained at the same time, called *terebene*, or *terebylene.* Hydrochlorate of camphene, $C_{20}H_{16}+HCl$, is white, lighter than water, has a camphoraceous taste and odor, is neutral to test paper, fuses above 212° F., is insoluble in water, soluble in three parts of alcohol, burns with a greenish, sooty flame, and when distilled with lime, yields a volatile oil called *camphilen*, $C_{10}H_8$, which is isomeric with Oil of Turpentine, but possesses no rotating power in relation to polarized light,—and chloride of calcium is also obtained.

Oil of Turpentine, when acted upon by nitric acid, is changed into a nitrogenous resin, or, if the mixture be boiled for a long time, into *terebinic acid.* M. Chautard states that a substance coincident with chloroform is obtained by distilling Oil of Turpentine with water and chloride of calcium. Oil of Turpentine has the power of rotating the ray of plane-polarized light, but the degree of this power is not uniform. The direction of rotation differs, being left-handed in the French oil, and right-handed in the American and English. If the oil be distilled over an open fire, its power of rotation increases; but if the distillation occurs over pulverized slate-stone, that power is lessened, and the turpentine acquires the power of dissolving caoutchouc in greater quantity than before.

Camphene, when kept for some time, always contains a little absorbed oxygen; combined with one equivalent of oxygen, it forms camphor; and with two equivalents it forms camphoric acid.—*P.*—*C.*—*T.*

Properties and Uses.—The actions of Oil of Turpentine are complex. It is irritant, stimulant, cathartic, diuretic, vermifuge, and, in relation to chronic mucous discharges, astringent. Given in large doses it occasions fulness of the head, or giddiness, with a feeling similar to that of intoxication, or a state resembling trance; sometimes it gives rise to pain in the stomach, nausea, and vomiting, and more frequently it gives rise to violent strangury, bloody urine, and other symptoms of renal or vesical irritation. In small doses long continued, or when absorbed from its external application, or its vapor inhaled, it renders the urine of a violet odor, and sometimes produces strangury. Its most constant effect is purgation, and when this occurs, the other effects seldom present themselves. In medicinal doses it warms the stomach, elevates the temperature of the surface, quickens the pulse, and when given at short intervals, in slight doses, it acts upon the kidneys causing an increased urinary discharge. In the typhoid stage of febrile diseases, especially when intestinal ulceration is diagnosed from the symptoms, the tongue becoming dry and dark-colored, the skin dry and husky, and tympanitis is present, with occasionally mental derangement, small doses given at short intervals and continued for some time, will act as a stimulant, remove all these symptoms, and gradually restore the patient to health. It is supposed, in these instances, to normally influence the ulcerated tissues. It is likewise recommended in neuralgia, chronic rheumatism, dropsy, suppression of urine, worms, especially tenia—tympanitic distension in typhoid fever, peritonitis, or other diseases—chorea, hysteria, croup, colic, jaundice, and in cases where gravel is habitually carried off by copious discharge of lithic acid, and lithate of ammonia. It has a tendency to diminish excessive mucous discharges, and has been employed with advantage in chronic catarrh, chronic dysentery, chronic diarrhea, chronic inflammation of the bladder, gleet, chronic gonorrhea, and leucorrhea. The dose in ordinary cases is from six drops to half a fluidrachm, and even to one drachm, at intervals of an hour or two in acute diseases, and every three or four hours in chronic. In the course of its action it is absorbed, and imparts its odor to the breath and perspiration. In doses varying from twenty minims to a fluidrachm, according to the urgency of the symptoms, and repeated every three or four hours, it is a most efficacious astringent, and may be used in epistaxis, hematemesis, hemoptysis, and other sanguineous discharges. It may be administered in water, flavored with some agreeable aromatic syrup, or in infusion of matico, in hemoptysis; in the decoctions of uva ursi, epigea, or eupatorium, etc., in hematuria; or in the decoction or infusion of Peruvian bark in purpura hemorrhagica. Where much arterial blood has been lost, muriated tincture of iron will form a valuable adjunct. Combined with castor-oil, it is an excellent vermifuge. Externally it is a rubefacient, and is used as a counter-irritant in the form of liniment in rheumatism, paralysis, neuralgia, inflammation of internal organs, in the neighborhood of indolent tumors, to chilblains, indolent and erysipelatous ulcers, caries, sloughing, especially from pressure in exhausting diseases, chronic inflammation of the edge of the eyelids, and in recentburns or scalds combined with linseed oil.

Where deafness is occasioned by a scanty or abnormal secretion of cerumen, the Oil of Turpentine rubbed up with some bland oil, may be passed into the ear, on cotton. In amenorrhea arising from torpor of the uterine vessels, in obstinate constipation, in tympanitis, or when the bowels are distended with flatus, and in ascarides, Oil of Turpentine used as an injection will frequently be found a superior remedy. From four to eight fluidrachms may be rubbed up with half a pint of water and the yolk of a few eggs, or with some mucilage, and injected into the rectum, where it should be retained for some time.

When given internally, it may be administered in simple or aromatized syrup, or rubbed up with sugar, or, taken in gin, when not contra-indicated, etc.; or it may be triturated with the yolk of egg, gradually adding syrup, and essence of cinnamon, with a portion of water. One yolk is sufficient for trituration with every two fluidrachms of the oil. In tapeworm it has been combined with gin, and given in doses of one or two fluidounces. As an ordinary vermifuge, three or four parts of castor-oil may be added to one part of the Oil of Turpentine.

Dr. James Warren has used a preparation for nearly thirty years in the treatment of hemorrhages, with uniform success. It acts both by its sedative power, in diminishing the force of the circulation, and by its astringent qualities, in contact with the bleeding vessels. He is satisfied that no remedy now known exerts a more specific power and more speedy relief, especially in hemoptysis, hematemesis, epistaxis, and menorrhagia. In the treatment of hemorrhage, neither bloodletting, confinement to the room, suppression of the voice, relaxation from business, nor other precautions are necessary; nor is any auxiliary treatment required, except, perhaps, a purgative dose where there is evidence that blood has been swallowed. Exercise in the open air is decidedly preferable to inaction; and wherever there are premonitory symptoms of a return of hemorrhage, it has always exerted a prophylactic power when promptly used; and by this early resort to it, many radical cures have been effected. He terms it "*Styptic Balsam.*" It is made as follows: Place sulphuric acid, five drachms by weight, in a Wedgewood mortar, and slowly add to it, Oil of Turpentine two fluidrachms, stirring it constantly with the pestle; then add in the same manner Alcohol two fluidrachms, and continue stirring until no more fumes arise, when it may be bottled, and should be stopped with a ground stopper. It should be prepared from the purest materials; and when made should exhibit a dark but clear red color, like dark blood; but if it be a pale, dirty red, it will be unfit for use. The dose is forty drops, to be used as follows; into a common-sized teacup put a teaspoonful of brown sugar, thoroughly incorporate the forty drops by rubbing together, and then slowly stir in water until the cup is nearly full, when it should be immediately swallowed. The dose may be repeated every hour, for three or four hours, and its use should be discontinued as soon as fresh blood ceases to flow. After standing a few days, a pellicle forms upon the surface of the balsam, which should be broken, and the liquid below it used. If in well-stopped bottles, age does not deteriorate it.—*N. Y. Jour. Med.*

Off. Prep.—Emplastrum Myricæ; Emplastrum Picis Compositum; Enema Terebinthinæ Composita; Linimentum Terebinthinæ; Linimentum Nigrum; Mistura Copaibæ Composita; Mistura Olei Composita; Pilulæ Ferri Compositæ; Tinctura Camphoræ Composita; Unguentum Myricæ; Unguentum Plumbi Compositum: Vinum Phytolaccæ Compositum.

OLEUM TIGLII.

Croton Oil.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE EXPRESSED OIL OF THE SEEDS OF CROTON TIGLIUM.

Description.—Croton Tiglium is a middle sized tree, the young branches of which are terete, smooth, shining, and somewhat furrowed toward the extremities. The *leaves* are alternate, petiolate, oval-oblong, acute, three to five nerved at the base, acuminate at the apex, with shallow glandular serratures; thin, membranous, with two glands at their base, covered when young with very minute stellate scattered hairs, dark-green above, and paler below. The *petioles* are about one-third the length of the leaf, channeled, having stellate hairs when quite young, but soon losing them. The *flowers* are downy, and arranged in erect, terminal racemes, the male flowers being at the apex, and the females below. The male flowers have a five-cleft calyx, five lanceolate, woolly, straw-colored petals, and fifteen distinct stamens; the females have a five-cleft, permanent calyx, with long and bifid styles. The *fruit* is a smooth, oblong, obtusely triangular capsule, about the size of a hazel-nut, closely covered with minute stellate hairs, three cells, each of which is completely filled with a solitary seed. The skin of the *seeds* is of a pale dull-brown color, and overlays a harder dark integument.—*L.*—*Wi.*

History.—This tree is a native of the East Indies, and has been introduced into the West Indies. Like the various plants of this natural order, it is imbued with a sharp, energetic, drastic cathartic element. The oil obtained from the seeds is the officinal portion. The seeds are of an ovoid form, about the size of a pea, reddish-brown when recent, grayish-brown when old, sometimes brownish-black. They consist of a thin, brittle, ligneous shell; a delicate, white, membranous integument; and an oleaginous kernel composed of a pale yellowish-white albumen, and a beautiful embryo, with large, leafy cotyledons. The oil is obtained by removing the shells from the seeds, bruising these to a pulp, and subjecting the pulp to strong pressure. About fifty per cent. of oil is thus obtained, and ten per cent. more may be removed by digesting the residue with sulphuric ether, filtering, and expelling the ether by a gentle heat. It may likewise be obtained by decoction of the pulp in water. Guibourt obtained by expression 41.6 per cent. of oil from the kernels of the seeds, and subsequently 10.4 per cent. by the action of alcohol: making together 52 per cent., or nearly 35 per cent. for the entire seeds.—*P.* Upon analysis Croton seeds are found to contain seed-coats and woody fiber of the nucleus, traces of volatile oil, fixed oil, crotonic acid, stearin and wax, brownish-yellow resin insoluble in ether, coloring matter, crotonates, extractive, sugar, malates of potassa and lime, starchy matter, phosphate of lime and magnesia, gum, albumen, gluten, and water.—*Brandes.*—*Weppin.*

Crotonic acid is the supposed active constituent of Croton Oil, and passes out with the oil either by expression, by ether, or by alcohol. It exists in the free state in the seed, but an additional quantity of it is obtained when the oil is saponified. According to Thomson the best method is to convert the oil into soap, by combining it with the requisite portion of potassa: the soap is then decomposed by tartaric acid, the whole filtered, and the liquid remaining is distilled in a well luted apparatus. An acid liquid comes over, having an acrid and disagreeable odor. Saturate with baryta water, evaporate to dryness, and decompose the baryta salt by concentrated phosphoric acid. The acid is distilled off, taking care to keep the receiver cool, and to have the joints of the apparatus well luted. In this way is obtained an aqueous solution of a solid, very volatile, fatty acid, which congeals at 23° F., and when heated a few degrees above 32° F., is converted into vapor, having a strong, nauseous odor, and which irritates the eyes and nose, and has an acrid taste. It unites with alkalies, forming *crotonates*, an inodorous class of salts. Mr. Redwood states that crotonic acid and its salts are inert or nearly so.—*P.*

The Croton Oil of commerce is partly imported from India, and partly expressed in England from the imported seeds. It varies in color from very pale yellow to that of deep-colored sherry, has an unctuous consistence, like castor-oil, which is increased by age, possesses a feeble odor, a peculiar, acrid taste, which is very persistent, and is felt most strongly in the back of the palate and throat. It is soluble in sulphuric ether, also in the volatile as well as fixed oils. English Croton Oil is of a reddish brown color, and forms a uniform, transparent mixture with equal parts of alcohol sp. gr. 0.796 without the aid of heat. The East Indian Croton Oil is pale yellow, like Canada balsam, and mixed with equal parts of alcohol, sp. gr. 0.796, forms an opaque milky solution, which is rendered transparent and uniform upon the application of heat. By standing, however, for twenty-four hours it separates into two layers, the lower one consisting of the oil which has taken up a small quantity of alcohol, and the upper one consisting of the alcohol, minus that absorbed in the lower stratum. Croton Oil is sometimes adulterated with castor-oil, which is difficult to detect in the English variety, but may be distinguished in the India oil by shaking the suspected article with absolute alcohol, which will dissolve the castor-oil, and have but slight influence on the Croton. It is stated that an oil not quite as active as the pure Croton is obtained from the Barbadoes' nuts, or the seeds of *Jatropha Curcas;* it is an active purgative in a dose of three to five drops. The seeds of the *Croton Pavana* are likewise supposed to furnish some of the Croton Oil met with in the shops.

Properties and Uses.—Croton Oil is a powerful irritant and cathartic. In large doses it is a dangerous poison, occasioning emesis, painful gripings, hypercatharsis, and other serious symptoms. Its action is prompt, frequently causing catharsis within an hour; and, from the smallness of its dose, it is especially adapted to cases where medicines requiring large doses can not be given, as in trismus, coma, insanity, etc. In most cases, catharsis may be produced by placing a drop or two of the oil on the back part of the tongue. It is principally used as a purgative when the bowels are very torpid; in comatose conditions as a revellent; and in dropsy as a hydragogue. It is likewise asserted that, irrespective of its cathartic property, it possesses efficacious influences in spasmodic and painful nervous affections. It may be used in all cases where prompt and active purgation is indicated. It is distinguished from other powerful cathartics by occasioning much borborygmus or rumbling of wind, by its action commencing speedily and ending soon, and by the purgative effect, however exhausting at the time, being followed by little debility. Externally, it produces erythematic redness, intense burning, and an eruption of minute vesicles. A Croton liniment is made by mixing one part of Croton Oil with four or five parts of olive oil, or six parts of turpentine; it is rubbed on the skin several times a day to cause redness and a pustular eruption; it is very beneficial in follicular disease of the throat, affections of the larynx, bronchial vessels, and lungs, indolent tumors, and all painful attacks. The dose of Croton Oil is from one to six drops, which is best given on sugar, or made into a pill with crumb of bread, in order to avoid the disagreeable acrid sensation it occasions in the throat, with a constant tendency to hawk, as well as to prevent nausea or vomiting. Four drops of the oil, thoroughly rubbed around the navel, will, it is said, produce catharsis. Souberain recommends the following lozenges: take of vanilla chocolate half an ounce, sugar two drachms, starch two scruples, Croton Oil ten drops; mix thoroughly together, and form into sixty lozenges.

Off. Prep.—Ceratum Crotonis; Pilulæ Gambogiæ Compositæ.

OLIBANUM.

The Frankincense of the Ancients.

Nat. Ord.—Amyridaceæ, Burseraceæ (*Lindley*); Terebinthaceæ (*De Candolle*). *Sex. Syst.*—Decandria Monogynia.

GUM-RESIN OF BOSWELLIA SERRATA.

Description.—This is the *Boswellia Thurifera* of some botanists; it is a leafy forest tree growing on the Coromandel coasts and other parts of India. The *leaves* are deciduous, alternate toward the tops of the *branches*, unequally pinnated; *leaflets* in about ten pairs with an odd one opposite, oblong, obtuse, serrated, pubescent, sometimes they are alternate; *petioles* short. The *flowers* are white, or pale-rose color, on short pedicels, and arranged in single, axillary racemes, shorter than the leaves. The *calyx* is small, five-toothed, persistent; *corolla* with five obovate-oblong, very patent petals, acute at the base, inserted under the margin of the disk; æstivation slightly imbricative. *Stamens* ten, inserted under the disk, alternately shorter; *filaments* subulate, persistent. *Anthers* caducous, oblong. *Torus* a cup-shaped disk, fleshy, larger than the calyx, crenulated on the margin. *Ovary* oblong, sessile; *style* one, caducous, the length of the stamens; *stigma* capitate, three-lobed. *Fruit* capsular, three-angled, three-celled, three-valved, septicidal; *valves* hard. *Seeds* solitary in each cell, surrounded by a broad membranaceous wing. *Cotyledons* intricately folded, multifid.—*L.*

History.—Beside the gum-resin obtained from the above-described tree, there is another variety obtained from a tree inhabiting the neighborhood of the Red Sea; which tree, it is stated, grows upon the bare rocks, without any other support than a very round, thick substance, of a nature between bark and wood, which is thrown out from the base of the trunk, and which adheres very firmly to the rocks, etc. Olibanum is a translucent, brittle, whitish-yellow substance, in roundish tears, and usually covered by a whitish, farinaceous substance, produced by the pieces rubbing against each other. It has an acrid, aromatic taste, and a pleasant, resinous odor; and when burned, it produces a brilliant flame, and diffuses an agreeable aroma. It melts with difficulty, becomes soft and adhesive by chewing, forms an incomplete, white emulsion when rubbed up with water, and is dissolved by alcohol to the amount of nearly 75 per cent. Braconnot found it to contain 56 parts of resin, 30 of gum, 8 of volatile oil, 5.2 of a gummy matter, insoluble in water or alcohol, and 0.8 loss. The oil was of a lemon color and odor. The resin was reddish-yellow, brittle, tasteless, softened by boiling water, and when burned emitted an agreeable odor. The gum was precipitated from its aqueous solution by infusion of galls, and was partly converted into saclactic acid by nitric acid.

Properties and Uses.—Olibanum is a stimulant; it is principally used as a fumigating article, and occasionally forms an ingredient of plasters.

ONOSMODIUM VIRGINIANUM.

False Gromwell.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT AND SEEDS.

Description.—This plant is the *Onosmodium Hispidum*, of Michaux, and the *Lithospermum Virginianum* of Linnæus; it is also known by the common names of *Gravel-weed*, and *Wild Job's-tears*. It is a perennial herb, clothed all over with harsh and rigid appressed bristles; the *stems* are rather slender, and grow from one to two feet in height. The *leaves* are oblong, or oblong-lanceolate, often oval, and even ovate-lanceolate, sessile, minutely strigose, three to five veined, the lower ones narrowed at base, and from an inch to two and a half inches long, by half an inch or three-quarters of an inch broad. The *flowers* are yellowish white, in terminal, leafy racemes, which are recurved at first, but finally become erect and elongated. *Calyx* five-cleft, the lobes lanceolate, pilose on both sides and half as long as the corolla. *Corolla* oblong-tubular, with a ventricose, half five-cleft limb, with lance-subulate segments, and clothed externally with long, hispid hairs. *Stamens* five, with very short, flattened filaments supporting included, sagittate, apiculate anthers. *Style* much exserted, smooth. *Achenia* ovoid, smooth, and shining, fixed by a flat base.—*G.*—*W.*

History.—This plant is found growing from New York to Florida, in dry, hilly grounds, flowering from June to September. The root and seeds are the parts employed, and yield their virtues to water. There are two other species of this genus which possess similar properties. These are the *Onosmodium Carolinianum*, growing in rocky hills, and along river banks from New York to Carolina and Tennessee; it grows from one to four feet high, has a stout, upright, soft, white, pubescent stem, with stouter and larger leaves than the preceding variety; *lobes of the corolla* deltoid-ovate, obtusish, more or less hairy on the back; *anthers* oblong, longer than the narrow filaments, and silky-pubescent.

The other is the *Onosmodium Strigosum*, growing in the Western States, and found abundantly in Tennessee and Illinois in wet prairies and woods, on hill-sides, and growing principally in rich limestone grounds. The *stem* is erect, simple, pilose-hispid, very leafy; the *leaves* are sessile, lance-linear, three inches long, and one inch wide, three-veined, with appressed hairs, nearly smooth beneath the veins; *bracts* lance-linear, silky; *calyx lobes* linear, acute, silky, with appressed hairs on both sides, very long; *corolla* cylindrical, larger than in the last, a third longer than the calyx, silky, pubescent outside; *anthers* linear, much longer than the vertically-dilated filaments.—*G.*—*W.*

Properties and Uses.—Diuretic and tonic. Said to dissolve calculi. A strong infusion of the root and seeds, taken every two hours for about a day, or until it purges, in doses of four fluidounces, is highly extolled as a cure for calculous affections. Care must be taken that it be not employed too long, for fear of producing too great a flow of urine. It is worthy of a full investigation.

ORIGANUM VULGARE.

Origanum.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Origanum Vulgare or *Wild Marjoram* is a perennial herb, with erect, leafy, hairy, purple, quadrangular, corymbose *stems*, from six inches to two feet in height. The *leaves* are opposite, petiolate, broad-ovate, obtuse, subserrate, hirsute, rounded at the base, green on both sides, sprinkled with resinous dots, and paler beneath. The *petioles* are hairy, and one-fourth as long as the leaves. The *flowers* are numerous, of a purplish-white color, and are disposed in smooth, erect, roundish, panicled, and fasciculate spikes, and accompanied with ovate, purplish bracts longer than the calyx. The *calyx* is ovate-tubular, striated, with nearly five equal teeth, and hairy in the throat. The *corolla* is funnel-shaped, about the length of the calyx, slightly two-lipped; the upper lip suberect, flat, emarginate, the lower trifid, lobes nearly equal. *Stamens* four, exserted, somewhat didynamous, with double anthers; the *stigma* bifid and reflexed. *Achenia* dry, somewhat smooth.—*G.*—*W.*—*L.*

History.—Wild Marjoram is common to Europe and America. It is found in limestone regions, on dry banks, and in dry fields and woods, flowering from May to October. The whole herb is officinal, but it is seldom collected, except for the purpose of procuring its volatile oil, on which its virtues depend and which may be separated by distillation with water. The plant has a strong, peculiar, rather agreeable balsamic odor, and a warm, bitterish, aromatic taste, which properties are imparted to alcohol, or boiling water by infusion.—The *Origanum Majorana*, or Sweet Marjoram, possesses properties similar to the above species. It is a native of Portugal, but cultivated in our gardens, and much used in cookery as a seasoning. Its *leaves* are oval or obovate, obtuse, entire, petiolate, hairy pubescent; the *flowers* pink-colored, in compact, roundish, pedunculate, terminal spikes, with roundish bracts. It flowers a month earlier than the preceding species; its odor is stronger, and more agreeable, and its taste more camphoraceous.—*W.*

Properties and Uses.—Origanum is gently stimulant, tonic, and emmenagogue. A warm infusion produces diaphoresis, and tends to promote menstruation, when recently suppressed from cold. It is sometimes employed externally in fomentation.

Off. Prep.—Infusum Origani; Linimentum Capsici Compositum; Linimentum Olei Compositum; Linimentum Saponis Camphoratum; Oleum Origani; Tinctura Camphoræ Composita.

ORNUS EUROPÆA.

Manna-tree.

Nat. Ord.—Oleaceæ. *Sex. Syst.*—Diandria Monogynia.

THE CONCRETE JUICE. MANNA.

Description. — The Manna-tree, or *Flowering Ash*, is a small tree, usually twenty or thirty feet high, with a close round head; the bark is smooth and grayish. The *leaves* are opposite, unequally pinnated in three or four pairs; *petioles* furrowed; *leaflets* petiolate, oblong, acute, serrated, very hairy, at the base of the midrib on the under side. The *flowers* are white, appear with the leaves, and are in dense, terminal, nodding panicles. *Calyx* very small, four-cleft. *Corolla* divided to the base into linear, drooping segments. *Stamens* two; *anthers* yellow, incumbent. *Pericarp* a winged key, not dehiscing.—*L.*

History.—The Manna-tree is a native of most parts of southern Europe. The officinal part is the juice of the tree, known in commerce as "Manna." Manna issues from the tree in part spontaneously from fissures, partly from punctures produced by an insect, but more generally from incisions made in the tree during the warm summer months, from which the viscous and nearly colorless juice flows out, and speedily hardens. These incisions are repeated annually, and alternately upon opposite sides of the tree, each season, so long as it yields Manna. There are several varieties of Manna, which chiefly differ from one another in quality according to the season and mode of gathering. The Sicily Manna is the most esteemed.

Flake Manna (*Manna cannulata*) is the finest kind met with; it is the Manna Gerace of the Sicilians. It is procured from the incisions on the upper part of the tree, during the height of the season, when the juice flows vigorously; and is collected on straws or twigs, etc., upon which it concretes in stalactitic masses. It is in light, porous and friable pieces, from one to six inches in length, and about an inch broad, and of a white, or pale yellow color.—*P.* Long keeping deepens its color. It has a honey-like odor, and a sweet taste followed by slight acridity; its fracture is somewhat crystalline. The next quality is *common Manna*, or *Manna in sorts;* this is gathered late in the season when the temperature is diminishing, so that the juice imperfectly concretes, and has to be exposed to the action of the sun to complete its drying. It is in pieces of a similar color to, but of less size than the flake Manna, and contains a soft, adhesive substance of a dark yellowish-brown color; its taste is rather unpleasant. A third variety, termed *Fat Manna*, is gathered in the latter part of autumn, when the season is wet and cool, and in consequence of which, it does not readily concrete. A fatty Manna is also said to be procured from the incisions made in the lower part of the tree, during the warmer months. Fat Manna is less solid than the preceding varieties, adhesive, not brittle, of a yellowish-red or yellowish-brown color, of a strong, honey odor, a mawkish, sweet, unpleasant taste, and mixed with sand, pieces of bark, and other foreign substances.

Various other trees of the family *Ornus* and *Fraxinus* furnish Manna, as the *O. Rotundifolia*, *O. Parvifolia*, *O. Subrufescens*, *O. Lentiscifolia*, *F. Excelsior*, etc. The *Abies* or *Pinus Larix*, yields a sweet exudation called Briancon Manna, but which contains no mannite ; the *Hedysarum Alhagi* of Syria, yields the Manna Mereniabin, an inferior Manna; the *Larix Cedrus* produces the Manna of Lebanon ; the *Tamarix Gallica*, the Manna of Mount Sinai ; and the *Eucalyptus Mannifera*, a kind of Manna called New Holland Manna, containing a saccharine principle, but no mannite.

The odor of Manna is feeble, but somewhat like that of honey, and its taste is sweet, but afterward rather acrid ; in the inferior kinds the taste s disagreeable. Duncan states that " the best Manna is in oblong, light friable pieces or flakes, of a whitish or pale-yellow color, and somewhat transparent, having often a fibrous crystallization internally. It melts easily on the tongue, and has a sweet, somewhat sharp taste, not nauseous or unpleasant, and a very weak, not nauseous odor. The inferior kinds are moist, unctuous, and dark-colored." When long kept, Manna loses its white color, and gradually changes to a yellowish-red or brown. It softens with the heat of the hand, melts at a temperature somewhat higher, and is inflammable, burning with a blue flame, throwing out yellow sparks. Pure Manna is almost entirely dissolved in three parts of water at 60° F., and one part at 212° F., from the latter of which it is deposited on cooling, in crystalline forms. It is soluble in eight parts of alcohol, and if a saturated alcoholic solution be made by heat, on cooling, the pure Manna will concrete into a perfectly dry, white, spongy, crystallized mass. In consequence of its sugar, it is capable of undergoing fermentation, during which the sugar is lost. Leuchtweiss analyzed Manna in 1845, and found it to contain, mannite, sugar, mucilage with some mannite, resinous, and acid matter, and a small quantity of a nitrogenous substance, insoluble matter, water, etc.—*P.*—*Ed.*

Mannite is procured most readily by Ruspini's process : Common Manna is first prepared by melting it over the fire in rain or distilled water, in which the white of egg has been previously beaten ; boil and strain the solution through a linen cloth ; the strained liquor solidifies on cooling. Submit the prepared Manna to strong pressure, then mix it with its own weight of cold water, and again press it. Dissolve the pressed cake in boiling water, add animal charcoal, and then filter and evaporate the solution, which is then to be set aside to crystallize. It is in white, acicular, four-sided prisms, in radiated tufts, and is sweet, odorless, requiring five parts of water to dissolve it, is readily dissolved in boiling alcohol, much less so in cold, and does not ferment when in contact with yeast, nor does its solution possess the property of rotatory polarization. Nitric acid converts it partly into oxalic, and partly into mucic acid. It consists of six equivalents of carbon, seven of hydrogen, and six of oxygen. One or two ounces will, it is stated, act as a gentle laxative. Good Manna is seldom counterfeited, though the inferior sorts are, occasionally. A spurious article is said to be made of sugar and honey combined with some mild laxative. The inferior Manna is likewise purified so as to resemble the flake variety; but all these frauds are easily detected.

Properties and Uses.—Manna is nutritive in small doses, and mildly laxative in large ones. It operates without causing any local excitement or uneasiness, and is useful as a laxative for young infants, children, females during pregnancy and immediately after, inflammation of the abdominal viscera, disorders of childhood, hemorrhoids, costiveness, etc. It is commonly added to other purgatives to improve their flavor, as well as to increase its purgative effect. An ounce or two may be taken by an adult; one, two, or three drachms, by a child, according to its age. Two or three parts of Manna to one of senna, may be made into a laxative infusion, for children. Sometimes, Manna causes flatulency and griping, which may be obviated by combining it with any grateful warm aromatic.

OROBANCHE VIRGINIANA.

Beech Drops.

Nat. Ord.—Orobancheaceæ. *Sex. Syst.*—Polyandria Digynia.

THE PLANT.

Description.—This plant is the *Epiphegus Americanus* of Nuttall, the *E. Virginiana* of Barton, and is also known by the name of *Cancer-root.* It is a parasitic growth, with a smooth, fleshy, leafless *stem*, about a foot, or a foot and a half in height, with slender and irregular branches given off the whole length of it. The *root* is scaly, and tuberous, covered with stiff, short, and brittle radicles. Instead of *leaves* it has only a few, scattered, inconspicuous, ovate scales, one at the base of each branch, of a yellowish or purplish color. The *flowers* are alternate, scattered on each branch, subsessile, the lower perfect and fertile, the upper usually imperfect and abortive. *Calyx* short, five-toothed. *Corolla* of the perfect flowers, two-lipped; the upper lip emarginate, the lower three-toothed; of the imperfect, slender, four-toothed, deciduous, six to eight lines long, curved, whitish and purple; the upper tooth or lip broadest, notched at the apex, arched not longer than the others. *Stamens* as long as the corolla; *filament* smooth; *anthers* two-lobed, acute at the base, valveless, dehiscent in the middle. *Stigma* capitate, somewhat emarginate. *Capsule* gibbous, truncate, oblique, one-celled, compressed, half two-valved at the apex, with two approximate placentæ on each. *Seeds* very numerous, straw-colored, *shining*—*L.*—*W.*—*G.*

History.—This plant is found throughout North America, parasitic upon the roots of Beech trees, and flowering in August and September. The whole plant is a dull-red color, without any verdure. It has a disagreeable, astringent, and amarous taste, much lessened by desiccation. It yields its virtues to water. There are several other species of this genus, which are parasitic, and which possess analogous properties, as the *Orobanche Uniflora*, or one-flowered broomrape, and the *Orobanche Americana*, or American broomrape.

Properties and Uses.—An astringent. Used with benefit in hemorrhages of the bowels and uterus, and in diarrhea. Said to cure cancer, but it possesses no property of the kind. In erysipelas a decoction drank freely, and the parts bathed with it, has effected many cures. As a local application, the decoction or poultice will arrest the tendency of wounds or ulcers to gangrene; a poultice of equal parts of poke, white oak, and Beech Drops is very useful in herpetic affections. Also useful as a topical application to obstinate ulcers, aphthous ulcerations, leucorrhea, gleet, etc. Dose of the powder, from ten to fifteen grains. This plant seems to exert an influence upon the capillary system, somewhat similar to that produced by the tincture of muriate of iron.

ORYZA SATIVA.

Rice.

Nat. Ord.—Graminaceæ.—*Sex. Syst.*—Hexandria Digynia.

THE SEEDS DEPRIVED OF THEIR HUSKS.

Description.—Rice is an annual plant with several jointed *culms* or *stems*, from two to ten feet in height. The *leaves* are long, slender, and clasping. *Panicle* terminal, diffuse, bowing when the seed is weighty. *Spikelet* hermaphrodite, one-flowered. *Glumes* two, small. *Paleæ* two, adhering to the ovary. *Scales* two, smooth; *stamens* six; *ovaries* sessile; *styles* two; *stigma* feathery. *Caryopsis* compressed inclosed by the paleæ.—*W.*—*G.*—*P.*

History.—Rice is supposed to have been originally a native of the East Indies, but it is at present cultivated in nearly all parts of the world, where the soil and climate are favorable. The husked seeds of the plant constitute the ordinary commercial Rice. Carolina Rice, on analysis, has been found to consist of 85.07 per cent. of starch, 3.60 of gluten, 0.71 of gum, 0.29 of uncrystallizable sugar, 0.13 of a tallowy oil, 4.80 of woody fiber, 5.00 of water, and 0.40 of saline matters. (*Braconnot.*) M. Payen found Rice to contain starch 89.15 parts; gluten and other azotized matters 7.05; dextrine, glucose, or congenerous substances 1.; fatty matters 0.80; cellulose 3.; silica, phosphates of lime, magnesia, and soluble salts of potassa and soda 0.90.

Properties and Uses.—Rice is nutritious, and boiled in water till perfectly soft, is very useful in cases of debilitated stomach or bowels, and diarrhea; it is likewise reputed a valuable article of food to overcome the diarrhea so common to those who for the first time use the river waters of the Western States. It is by some considered injurious to the eyes when used in any quantity, but this is an erroneous opinion, as many nations employ it almost exclusively as a diet, without any such effects. A decoction of rice (*rice-water*) is an excellent soothing and nutritive drink in febrile diseases, and likewise in inflammations of the internal organs.

OSMORRHIZA LONGISTYLIS.

Sweet Cicely.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This is the *Uraspermum Claytoni* of Nuttall; it has a perennial, thick, fleshy, branching *root*, of an agreeable, aromatic flavor, and an erect, nearly smooth *stem*, branching above, and growing from two to three feet high. The *leaves* are large, decompound, the ultimate divisions often pinnate; the radical leaves on long, slender petioles, the cauline sessile. The *leaflets* are irregularly divided by clefts and sinuses into lobes and teeth; the lobes broadly ovate, and slightly pubescent. The *flowers* are white, in axillary and terminal umbels, about five-rayed, the central ones barren, and the outer ones fertile. *Calyx-margin* obsolete; *petals* oblong, nearly entire, with a short inflexed point. *Involucres of linear bracts* longer than the rays. *Style* as long as the villose germ, filiform, erect, deflexed. *Fruit* linear-oblong, about an inch in length, angled, tapering downward into a stalk-like base, contracted at the sides, blackish, and crowned with the persistent styles. *Carpels* with five equal, acute, upwardly bristly ribs; commissure with a deep, bristly channel; intervals without vittæ.—*W.*—*G.*

History.—This plant grows in various parts of the United States, in rich moist woods, on the sides of low meadows, on the banks of running streams, and on the borders of low woodlands. It flowers in May and June. The root is the part employed; it has a sweet smell and taste, resembling aniseed, and yields its sensible properties to water or diluted alcohol.

Properties and Uses.—Sweet Cicely is aromatic, stomachic, carminative, and expectorant. Useful in coughs, flatulence, and as a gentle stimulant tonic to debilitated stomachs; the fresh root may be eaten freely, or it may be used in infusion with brandy or water.

OSMUNDA REGALIS.

Buckhorn Brake.

Nat. Ord.—Filices (*Lindley*); Polypodiaceæ (*Brown*). *Sex. Syst.*—Cryptogamia Filices.

THE ROOT.

Description.—This is the *Osmunda Spectabilis* of Willdenow, often termed *Royal Flowering Fern.* It has a hard, scaly, tuberous rhizoma, beset with numerous fibers, and having a whitish core in the center. The *fronds* are several, erect, three or four feet high, doubly-pinnate, smooth, bright green, the primary divisions or *pinnæ* from six to ten, nearly opposite, remote, hardly a span long. The *leaflets* are more numerous, often alternate, sessile or nearly so, oblong, bluntish, entire or obscurely-crenate with one rib, and numerous transverse veins; the base dilated, heart-shaped, or somewhat lobed. Some of the upper leaflets are cut, and as it were, partially transmuted into dense clusters or spikes of innumerable, small, light-brown, veiny, globular, two-valved *thecæ* entirely covering the segments; several of the upper divisions of the leaf consisting entirely of such thecæ, composing a compound panicle. *Spores* green.—*L.*—*W.*—*G.*

History.—This beautiful fern is found in meadows and low, moist grounds throughout the United States, flowering in June. The main roots or caudex, is the officinal part; it is about two inches long, and has the shape of a buck's horn. It is composed of a number of layers or scales, which are elongated, imbricated, with satiny, translucent margins, and throws out a mass of entangled, delicate radicles. It contains an abundance of mucilage, which is extracted by boiling water. The root should be collected in August, or about the latter part of May, and dried with great care, as they are apt to become moldy.

The *Osmunda Cinnamomea*, or Cinnamon-colored Fern, is inferior to the preceding, but is frequently used for the same purposes. Its root is similar, but much larger, and when its stems are young, during the spring months, they present a white or cinnamon-colored pubescent appearance, with the leaves circinate and downy.

Properties and Uses.—Mucilaginous, tonic, and styptic. Used in coughs, diarrhea, and dysentery; also used as a tonic during convalescence from exhausting diseases. One root, infused in a pint of hot water for half an hour, will convert the whole into a thick jelly. Very valuable in leucorrhea, and other female weaknesses, and said to be an almost certain cure for rickets, in doses of three drachms of the root, three times a day. The mucilage mixed with brandy is a popular remedy as an external application for subluxations and debility of the muscles of the back. For internal use, the roots may be infused in hot water, sweetened, and ginger, cinnamon, brandy, etc., added if not contra-indicated.

OSTRYA VIRGINICA.'

Iron-wood.

Nat. Ord.—Cupuliferæ. *Sex. Syst.*—Monœcia Polyandria.

THE INNER WOOD.

Description.—This is a small tree from twenty-five to thirty feet in height, remarkable for its fine, narrow, longitudinally divided and brownish *bark*. The *wood* is white, hard, and strong. The *leaves* are oblong-ovate, subcordate, acuminate, unequally serrate, somewhat downy; *buds* acute. *Sterile flowers* in cylindrical aments; *scales* orbicular-ovate acuminate, ciliate, one-flowered; *filaments* somewhat united irregularly; *anthers* bearded at the summit. *Fertile flowers* in pairs, numerous, in a short, oblong, pendulous, loosely imbricated, linear, terminal ament, with small deciduous bracts; *scales* none, but each flower is inclosed in a membranous sac-like involucre, bristly-hairy at the base, and which enlarges, forming a bladdery closed bag in fruit, these being imbricated to form a sort of strobile appearing like that of the hop. *Ovary* two-celled, two-ovuled, crowned with entire and bearded border of the perianth, forming a small and seed-like smooth nut. *Styles* two, united at the base: *nut* lance-oblong, somewhat compressed, included in the enlarged, imbricated, bladder-like sac.—*G.*—*W.*

History.—This plant, sometimes called *Hop-hornbeam*, *Lever-wood*, etc., is a tree common to the United States, growing in rich woods, and flowering in April and May. The flowers are green, and appear with the leaves, and the large and handsome oval-oblong strobiles are matured in August. The inner wood and bark are the parts used; they are bitter, and yield their virtues to water. There is another tree known as *Iron-wood*, closely resembling the above, the *Carpinus Americana;* it grows from ten to twenty feet high, has a smooth gray bark, with an irregularly ridged trunk, and very fine-grained, compact, white wood. The scales of the fertile aments are three-parted, the middle segment being much the largest, oblique, with a lateral tooth, persistent, and becoming foliaceous. The nut small, ovoid, bony, ribbed, with a simple, one-sided, enlarged, and open leaf-like involucre. This tree is not bitter, and must not be confounded with the Ostrya.—*G.*—*W.*

Properties and Uses.—Iron-wood is antiperiodic, tonic, and alterative. It has been used with efficacy in intermittent fevers, neuralgic affections, dyspepsia, scrofula, and all diseases where an antiperiodic tonic is indicated. Dose of the decoction, one or two fluidounces, three or four times a day.

OVUM.

Egg.

THE EGG OF PHASANIUS GALLUS.

History.—The *Common Hen*, or dunghill-fowl, *Phasanius Gallus*, supposed to have been originally the Jungle-fowl of India, is now domesticated almost every where. Its Egg is the part used in medicine, and comprises the egg-shell (*testa ovi* or *putamen ovi*), composed of carbonate of lime 97, phosphate of lime and magnesia 1, animal matter, with traces of sulphur and iron 2.—*Prout.* The carbonate of lime renders the shell absorbent and antacid. By calcination of the shell, nearly pure lime may be procured. The *pellicula ovi*, or *membrana putaminis*, is the albuminous membrane which lines the inner surface of the shell, and is soluble in alkalies, from which it is precipitated by acids. At the larger end of the Egg it forms the *follicula æris*, the air of which Bischoff asserts to contain 23.475 per cent. of oxygen.

The white or glaire, *albumen ovi*, is colorless, transparent, fluid, odorless, tasteless, and according to Gmelin consists of albumen 12.0, mucus 2.7, salts 0.3, and water 85.0. The white of Egg consists of two or three laminæ, which are not homogeneous, as two parts at least are discernible, viz., a solid, probably organized albumen, having the appearance of a very fine delicate membrane, forming a series of cells, in which is contained the liquid albumen. Water dissolves it, and alcohol, the concentrated acids, and a temperature considerably below boiling, coagulate it. White of Egg is precipitated from its solutions by the following substances, forming insoluble compounds with them : tannic acid, bichloride of mercury, creasote, salts of copper, chlorides of gold, and tin, ferrocyanuret of potassium, etc.

Placed in thin layers on glass, and dried in the air, it becomes solid without losing its transparency or property of dissolving in water, and may be preserved in this manner for a long time; these dried fragments will be found to answer as a substitute for the original white, when formed into a solution with water. White of Egg kept in its original condition speedily decomposes. It may be determined from the serum of the blood by its coagulating with ether; and from caseine, by its non-coagulability with acetic acid.

Albumen in urine becomes coagulated when heat is applied; and to prove that the deposit is albumen and not earthy carbonates, add nitric acid, which will dissolve the latter, but not the former. These tests should be used together, and never trusted separately. If the urine be alkaline, albumen will not be precipitated, until it is neutralized or rendered acid.

The yolk (*vitellus ovi*) consists of minute cells holding albuminous matter with yellow oil, and which becomes solid by coagulation. Triturated with water, yolk of egg produces a thick, opaque solution, much used in pharmacy for suspending oily and resinous substances in the former fluid. Heat solidifies it, and its oil may then be had by expression. According to Prout it consists of yellow oil with crystallizable fat 28.75, phosphoreted albumen 17.47, and water 53.8. The oil may also be obtained by boiling the yolk hard, then digesting it in ether or alcohol, filtering and distilling off the solvent, when the oil remains; it is composed of eleven parts of olein and one of stearin. Gobley found the yolk, when treated with water, to yield a liquid containing all the principles met with in gastric juice, vitellin, oleic and margaric acids, cholesterin, traces of lactic acid, iron, etc.

Properties and Uses.—Eggs are much employed in medical practice; the *shells*, when reduced to a very fine powder, may be used in acid conditions of the digestive tube, in the same doses as prepared chalk. The *albumen* or *white* is useful as a demulcent in diseases of the intestinal mucous membrane, and is a valuable agent in the treatment of poisoning by bichloride of tin, the soluble salts of copper, and bichloride of mercury; its efficacy in these cases is owing to its combining with the oxide or chloride of the metal, forming harmless compounds. In cases of redness or excoriation from pressure, it forms a good local application, when used in the form of a liniment, made by agitating it briskly with its own volume of alcohol. It is also employed as a clarifying agent for wines and some other liquids. Its efficacy depends on its coagulation, by which it entangles in its meshes the impurities with which it either rises to the surface or precipitates. When the liquid to be clarified does not spontaneously coagulate the albumen, it is necessary to apply heat.—*P.* The white is also used for diffusing throughout water, substances which are not dissolved by it. Mixed with a small quantity of alum, a coagulum is formed which has been found efficacious as a local application in some inflammations of the eye, after the more severe symptoms have been subdued. The *yolk* is a mild nutrient, and generally does not offend the stomach; added to an infusion of ginger, and thoroughly beaten up with it, it has been found serviceable in dyspeptic cases. It answers a much better purpose than the white in the preparation of mixtures, emulsions, etc. Its powers as an antidote to poison are the same as those of the white. The oil obtained from the hard-boiled yolk has been found serviceable in cracked nipples. A non-collegiate practitioner in this county, has acquired some celebrity in the treatment of dyspepsia, loss of appetite, constipation, hemorrhoids, etc.; the agent he employs is a powder composed of equal parts of the inner skin of chickens' gizzards (*ingluvies pulli*), dried and pulverized, sulphur, and resin, of which from five to ten grains are to be taken three or four times a day.

Off. Prep.—Linimentum Terebinthinæ.

OXALIS ACETOSELLA.

Wood-sorrel.

Nat. Ord.—Oxalidaceæ. *Sex. Syst.*—Decandria Pentagynia.

THE WHOLE HERB.

Description.—Wood-sorrel is a small, perennial, acaulescent herb, with a creeping and scaly-toothed *root-stock.* The *leaves* are numerous, radical, palmately three-foliate, on long, weak, hairy stalks; the *leaflets* are broadly obcordate, with rounded lobes, entire, pubescent, of a yellowish-green color, but frequently purplish beneath; they close and droop at nightfall. *Scape* longer than the petioles, one-flowered, with two scaly bracts near the middle. *Flowers* white, yellowish at the base, delicately veined with purple, scentless. *Stamens* ten, monadelphous at the base, alternately shorter; *sepals* five, persistent; *petals* five; *style* as long as the inner stamens. *Capsule* five-lobed, five-celled, oblong; *seeds* several, with an elastic testa—*G.*—*W.*

History.—Wood-sorrel is indigenous to Europe and this country, growing in woody and shady places, and flowering from April to June. It is inodorous and has a pleasantly acid taste, which is somewhat impaired by drying. The acidity is due to the presence of oxalic acid in combination with potassa, forming a binoxalate of this alkali. In some parts of Europe this salt was formerly separated from the plant, and sold for the purpose of removing ink spots and iron marks from linen, having the term *Salts of Sorrel* applied to it. The *essential salt of lemons*, which is used for the same purposes, is a *quadroxalate of potassa;* each of these salts is poisonous when taken internally. Since the discovery of the conversion of sugar into oxalic acid by the action of nitric acid, these plants are seldom used in the preparation of the binoxalate of potassa.

There are other varieties of this plant, possessing analogous properties, as the *Oxalis Stricta* and *O. Violacea.* They all have ternate leaves with obcordate leaflets, and, with the exception of *O. Violacea*, bear yellow flowers.

Properties and Uses.—The several varieties of Sorrel are cooling and diuretic. Useful in febrile diseases, hemorrhages, gonorrhea, chronic catarrh, urinary affections, and in scurvy; it may be used in infusion with water, or it may be infused in milk to form whey, or the herb may be eaten, but in neither case to excess, on account of the oxalic acid they contain. Externally, the bruised leaves or inspissated juice have been found useful as an application to scrofulous, malignant and indolent ulcers. The *Rumex Acetosa* or Garden Sorrel, *R. Acetosella*, or Sheep Sorrel, and *R. Vesicarius* possess similar properties, which see.

PÆONIA OFFICINALIS.

Peony.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Digynia.

THE ROOT.

Description.—Peony has many, thick, long-spreading, perennial *roots*, running deep into the ground, with an erect, herbaceous, large, green and branching stem, about two or three feet high. The *leaves* are large; the lower leaves bipinnately divided; the *leaflets* are ovate-lanceolate, smooth, variously incised. The *flowers* are large, red, terminal, solitary; *sepals* five, unequal. *Petals* red, cordiform; *stamens* numerous, mostly changed to petals by cultivation. *Carpels* three; *stigmas* double, persistent; *follicles* fleshy, many-seeded; *seeds* black, numerous, dry, round.—*W.*—*R.*

History.—This is indigenous to southern Europe, and is cultivated in gardens in the United States and elsewhere, on account of the elegance of its large flowers, which appear from May to August. The *root* is the officinal part; it consists of a rootstock, from half an inch to an inch in diameter, from which proceed fusiform tubers gradually terminating in delicate fibers. These, together with the seeds, have, when recent, a strong, rather unpleasant odor, and a sweetish, mawkish taste, succeeded by a sub-acrid bitterishness and slight astringency; drying nearly removes these properties. The recent flowers have a similar but feebler odor, and a more herbaceous taste. They all yield their virtues to diluted spirits. No analysis has been made of this plant.

Properties and Uses.—Peony is antispasmodic and tonic. It has been successfully employed in chorea, epilepsy, spasms, and various nervous affections. In combination with white snakeroot, or black cohosh, it has proved valuable in pertussis. An infusion may be made by adding an ounce of the root in coarse powder to a pint of a boiling liquid, composed of one part of good gin, and two parts of water, which may be sweetened; dose, two or three fluidounces three or four times a day. Dose of the expressed juice of the recent root, one or two drachms; of the powdered root, a drachm three or four times a day; of the powdered seeds from thirty to forty grains. The seeds, taken night and morning, have been successfully used in removing the nightmare attendant upon dropsical persons; they are also reputed emetic, cathartic, and antispasmodic.

PANAX QUINQUEFOLIUM.

Ginseng.

Nat. Ord.—Araliaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—Ginseng has a perennial, fusiform, whitish, thick and fleshy *root*, transversely wrinkled, and terminating in fibers; its upper portion slender and marked with the scars of former shoots. The *stem* is round, smooth, green, often with a tinge of red, about a foot high, regularly divided at top into three petioles, with a flower-stalk in their center. *Petioles* round, smooth, swelling at base. The *leaves* are three, ternate, quinate or septenate. *Leaflets* pedicellate, obovate, sharply-serrate, acuminate, smooth on both sides, with scattered bristles on the veins above. The *flowers* are small, greenish, and arranged in a simple umbel, supported by a round, slender peduncle, which rises from the top of the stem in the center of the petioles. *Involucre* of a multitude of short, subulate bracts, interspersed among the flower-stalks, which are so short as to give the appearance of a head rather than an umbel. *Calyx* with five small acute teeth. *Petals* five, oval, reflexed and deciduous. *Stamens* five, with oblong anthers. *Styles* two, reflexed, persistent. *Ovary* large, inferior, ovate-cordate, compressed. *Berries* kidney-shaped, retuse at both ends, compressed, of a bright scarlet color, crowned with a calyx and styles, and containing two and sometimes three semicircular seeds. The outermost florets ripen first, and their berries often obtain their full size before the central ones are expanded, the central florets are frequently abortive. —*L.*—*W.*

History.—Ginseng is a native of most of the Middle and Northern States, and extends on the mountains far south, growing in rich soil and in shaded situations, and flowering in July. The root is somewhat fusiform, two or three inches in length, and about half an inch in diameter, and sends off a few delicate fibers. When dried, it consists of a soft, yellowish-white, corrugated bark, inclosing a central, woody substance; it has a faint smell, and its taste is sweetish, somewhat bitter, mucilaginous, and feebly aromatic; water or alcohol take up its properties.

Properties and Uses.—A mild tonic and stimulant. Useful in loss of appetite, slight nervous debility, and weak stomach. By some, it is considered useful in asthma, gravel, convulsions, paralysis, to invigorate the virile powers, etc. Dose of the powder, from ten to sixty grains; of the infusion, from two to four fluidounces.

PAPAVER SOMNIFERUM.

Poppy.

Nat. Ord.—Papaveraceæ. *Sex. Syst.*—Polyandria Monogynia.

THE CONCRETE JUICE OF THE UNRIPE CAPSULES. OPIUM.

Description.—The Poppy is an annual plant, with a tapering and white *root.* The *stem* is round, erect, smooth, occasionally a few hairs on its upper part, glaucous, branched, leafy, and from two to four or five feet in height. The *leaves* are alternate, from four to eight inches in length by two or three broad, amplexicaul, slashed, repand, with rather blunt teeth, sessile, ovate-oblong, glaucous beneath. The *flowers* are large, brilliantly white, or silvery gray, double by cultivation, on long, terminal, leafless peduncles, with bristly hairs. The *calyx* consists of two smooth, convex, deciduous sepals. The *corolla* is composed of four petals, very large, and sometimes with a deep purple spot at base. *Stamens* numerous; *anthers* oblong, compressed; *style* one; *stigmas* from four to twenty, radiating, sessile upon the crown of the nearly-globular ovary. *Capsules* obovate or globose, smooth, about the size of a middling apple, rather hard and brittle, one-celled, opening by pores beneath the lobes of the stigma, with numerous parietal placentæ. *Placentæ* many-seeded. *Seeds* reniform, oily, white or gray, sweet, and edible.—*L.*—*W.*

History.—There are two well-marked varieties of this species, which some botanists consider to be distinct, they are the *white*, Papaver Officinale, with ovate-globose capsules, foramina under the stigma either none or obliterated; peduncles solitary, seeds and petals white,—and the black, P. Somniferum, with globose capsules, opening by foramina under the stigma; peduncles many; flowers usually violet or red, of different tints, though sometimes white; seeds black. But, although these may naturally differ from each other, cultivation renders it very difficult, if not impossible to distinguish them. The white Poppy is considered to be the officinal one; it is supposed to be a native of Persia, though extensively cultivated in many of the warmer parts of the world. Beside the Opium which it yields, the seeds contain an oil, which is almost analogous with olive oil, and may be substituted for it; and there is no reason to doubt that its cultivation in this country would be very profitable. In Asia the flowering season is in February; in this country and Europe it is during the months of June, July and August. The officinal parts of the plant are the capsules, and Opium, or the concrete juice from the capsules; the seeds are employed for obtaining their oil.

The *capsules* of the Poppy, or *poppy-heads*, should always be gathered before they have ripened; at this time they abound in the juice from which Opium is formed, and which becomes greatly diminished when the capsule has fully matured. When dried, the unripe capsules possess the peculiar bitterness and narcotic qualities of Opium, which is hardly observable in those that are allowed to ripen. The dried capsules are of various sizes, from that of a small egg to that of a large orange, they are of an ovate or globular form, flattened underneath, and surmounted by the persistent stigma. The capsules of the white Poppy are larger than those of the black. They owe their virtues entirely to the Opium contained in them. *Poppy seeds* are very numerous, a single capsule containing many thousands. They are oleaginous and emulsive, and yield by expression a large quantity of a yellowish fixed oil, which, on being exposed for some time to the air, dries up into a varnish. The oil obtained frequently amounts to one-half the weight of the seeds. It, together with the seeds, is without odor, has a pleasant, mucilaginous taste, and is destitute of narcotic properties. The oil is pale-yellow, transparent, burns well, but with considerable smoke, and an unpleasant smell, and is principally employed by painters, and for the purpose of adulterating other higher priced oils; a good soap may be made with it.

Opium is procured from the unripe capsules. The whole plant is said to contain a whitish juice possessing narcotic properties, but in less quantity than the capsules. The mode of procuring it is as follows: A few days after the petals have fallen, the natives repair to the fields, and in the lower part of each poppy-head make a transverse or horizontal incision, carrying it round until it arrives nearly at the part where it commenced; sometimes it is continued spirally to half-way beyond its starting point. The greatest nicety is required to avoid cutting too deep, and penetrating the interior coating of the seed-vessel, as this would cause the juice to flow into the inside. A white substance immediately flows out, and collects in drops on the edges of the cuts. The following morning the capsules are scraped with a large dull knife, and the inspissated juice placed on a leaf. Each capsule is cut but once, and yields only a few grains of Opium. After the Opium is collected, the capsules are gathered, and the seed shaken out, and subsequently pressed in wooden lever presses to extract their oil. The Opium obtained as above has the form of a viscid, granular, gelatinous substance, and is generally beaten up with saliva, enveloped in dry leaves, and sold. It appears from the statements of various travelers, that the mode of collecting and preparing Opium for the market varies, the essential steps, however, being nearly similar. (See Dr. W. C. B. Catwell's account of the cultivation and preparation of Opium in the Benares Opium agency, published in the eleventh and twelfth volumes of Bell's Pharmaceutical Journal and Transactions, in 1852, and also the account of the production of Opium in Asia Minor, by Sidney H. Maltass, Esq., published in the same Journal, vol. XIV., 1855, p. 395.) Indeed, an examination of the several kinds of Opium would indicate a difference in method of elimination, as well as of the handwork which they have undergone. Sometimes it consists of small tears or drops, which have apparently been merely subjected to agglutination after collection; again, it is found composed of thin layers, partially inspissated on Poppy leaves, and afterward united along with the leaves into roundish masses; and that of Egypt, Hindostan, and Europe, is quite homogeneous; while the most common of the Indian varieties undergoes a species of fermentation, and is made up for commerce before it is thoroughly inspissated.

A Buchner, sen., from a series of experiments instituted by him, came to the following conclusions: 1. "The unripe does not surpass the ripe poppy-head in medicinal activity. 2. The unripe poppy-heads lose the greater part of their bitter milky juices by excision from the stalks, so that after drying they possess only a sweetish, mucilaginous, very slightly bitter taste, and by maceration in water yield an extract containing much mucilaginous and pectinaceous matters. 3. If in gathering the heads a very small quantity of the milky juices is lost, the unripe poppy-heads contain only a small quantity of meconate of morphia. 4. The ripe poppy-heads contain smaller quantities than the unripe of substances soluble in water or alcohol; their infusion is less mucilaginous or sweetish saline; it furnishes a thinner fluid, and has a much stronger flavor of Opium; it appears to contain meconate of morphia, and other salts of the alkaloid, which impart to it a soothing, sedative, or narcotic influence, but in much less degree than is possessed by Opium. 5. The proportions of the alkaloid in the unripe and ripe heads are relatively 100 to 258. 6. The ripe poppy-heads are superior to the unripe; and Winckler's proposal, that an extract thereof should be substituted for Opium, has been proved by Dr. Engerer and other physicians, to be deserving a careful chemical investigation. This extract should be prepared from the ripe poppy-head, freed from seeds and bruised to a coarse powder, then macerated in water, evaporated to a homogenous consistence, washed in alcohol, and after the alcohol has been the greater part removed, evaporated in a vapor-bath to the consistence of crude Opium." (*Jour. Pharm. and Trans., Vol. II., p.* 415, *from Buchner's Repertorium.*)

The Opium met with in commerce is principally that obtained from Turkey, Egypt, Hindostan, Persia and Europe. That from Turkey is the most esteemed, and is the kind chiefly used in the United States. It is imported direct from Smyrna, or immediately through several ports of Europe. It is prepared in Anatolia, and is usually imported in roundish, somewhat compressed cakes, weighing from four to eight ounces, and generally inclosed in a Poppy leaf, or presenting fragments of leaves, etc., externally. There are two varieties of Turkey Opium known in commerce, viz.: the Smyrna Opium and the Constantinople Opium. The *Smyrna Opium* occurs in irregular, rounded or flattened masses of various sizes and shapes, owing probably to mutual pressure in the soft state, and weighing from half a pound to two pounds, seldom three pounds. Internally, they are of a pale-brown, or light reddish-brown color, and when first imported are soft, but gradually become harder and darker. Externally, they are hard, blackish, and enveloped in leaves, and covered with the capsules of *R. Orientalis*, or *R. Patientia*, etc. The lumps seem to consist of minute agglutinated scales or tears, probably of the concrete tears formed on the edges of the cuts made in the capsules, and when cut they present a waxy luster. The skin of the capsules which is frequently detached during the process of separating the Opium from them, is generally found mixed up in the masses in small pieces. This is the best Opium, and the most common variety met with in the shops; it is more productive in morphia than any other variety, yielding from 9 to 13 per cent. of this alkaloid. There is an inferior article, or *Common Smyrna Opium*, of the form and size of the previous kind: it is commonly covered with Poppy leaves, and often with rumex capsules; it is harder because older; it has a darker color, sometimes brownish black internally, at times a musty smell, with more or less moldiness. It is sometimes homogeneous, and again appears to be composed of thin layers with interposed Poppy leaves. This variety is less productive of morphia than the preceding, and is likewise more liable to adulteration.

Constantinople Opium is met with in flat, roundish masses, varying from half a pound to nearly three pounds in weight, and somewhat resembles, externally, the superior Smyrna variety. Upon an examination, however, of its internal characters, it will be found most usually dry, hard, pale-brown, and homogeneous in texture, not containing any tears as met with in the preceding kind. In point of purity it is about equal to the Smyrna drug. It is occasionally met with in commerce. Guibourt has described another variety of Constantinople Opium, which is met with in "small, flattened, lenticular cakes, about two, or two and a half inches in diameter, and covered with a Poppy leaf, the median nerves of which divide the disk into two parts."—*P.* It is, however, an inferior kind.

The other varieties of Opium which are occasionally met with, are the Egyptian, Indian, and Persian. The *Egyptian* variety has been largely imported, but of late is gradually disappearing from our markets. It is in round flattened cakes, varying from three to five inches in diameter, weighing from four to eight ounces, and sometimes a pound, each being enveloped within a Poppy leaf, or exhibiting externally the fragments of some leaf. This Opium is dry, hard, and brittle, has a pale brown color, with a reddish hue, a waxy luster, and a feebler odor than the Smyrna Opium. It contains none of the rumex seeds or capsules, and though inferior to the Turkey Opium, yet occasionally parcels are met with as rich in morphia; but the quality is by no means uniform. It is probably adulterated in its preparation, and should not be used for making tinctures, nor for filling physicians prescriptions. The *India* or *East India Opium* very seldom reaches this country. A greater abundance of it is made than of any other kind of Opium, and in the East it commands very high prices, though inferior to Turkey Opium. The principal varieties of it are the Bengal and the Malwah Opium. The *Bengal Opium* is chiefly made near Patna and Benares. It is in hard roundish masses, of about three and a half pounds each, somewhat of the size of a child's head, and is usually packed in chests containing forty balls each. The balls are covered with tobacco leaves and Poppy petals, firmly agglutinated around them by a paste called *lewah*, forming a case about half an inch thick. The Opium is soft, of a blackish-brown color, possesses the odor and taste of ordinary Opium, and when exposed to the air soon becomes covered with mold. This is an inferior Opium, yielding from two to four per cent. of morphia, and is not only subject to adulteration, but is injured, in consequence of the juice being kept until fermentation takes place before it is made up. Another variety of Bengal Opium is the *Garden Patna Opium*, which is prepared from Poppy juice before it has fermented, according to Dr. Christison. It is in cakes about four inches square, and half an inch thick, weighing about a quarter of a pound each, and neatly packed with partitions of mica in cases of beeswax, in wooden boxes, or in tin canisters. It is superior to the preceding Bengal Opium, and contains nearly as much morphia as the Turkey Opium; it has not been imported as an article of trade.—*C.* *Malwah Opium*, according to Christison, "is in flat, roundish cakes, five or six inches in diameter, and weighing from four to eight ounces. They often present cracks near their circumference. They are commonly quite hard, dry, brittle, and almost pulverizable by the time they reach this country; they have a light brown color, a shining fracture, and a compact, homogeneous texture; and they are free of mechanical impurities. This sort is superior to the common Bengal Opium, and, probably, little, if at all, inferior to the Garden Patna variety." It is not met with in this country as an article of commerce.

Persian Opium has seldom been met with in our markets. It is in the form of cylindrical sticks about as thick as the little finger, five or six inches in length, and each of which is enveloped in a smooth, shiny paper and tied with cotton. It is soft and flexible, does not harden when kept for years, is of a paler-brown color than any other kind, and its texture, under the microscope, is distinctly granular, as if it were composed of agglutinated tears. It is a very inferior kind. Opium has been made upon a moderate scale in several parts of Europe, which was in no way inferior to the best imported drug, and could be furnished at a materially reduced price.

Opium when of good quality, has a strong, very peculiar, virose odor, with a most intense and persistent bitter taste, somewhat aromatic, and accompanied by a sensation of acridity. It has a reddish-brown or fawn-color, a compact and uniform texture, and its specific gravity is 1.336.—*Coxe.* The only change that good Opium undergoes by keeping, is that of becoming gradually hard; the inferior varieties are very apt to become moldy after a time. Persons not habituated to the use of Opium, will frequently have a heat and redness, and even vesication on the lips and mouth upon masticating it. The central portion of a ball of Opium is usually soft and cohesive, but becomes hardened and pulverable after a time, when acted upon by the air, yielding a dark-yellowish, cohesive powder. At a gentle heat Opium softens and becomes tenacious, and at a higher temperature it burns, evolving peculiar odorous fumes. Five parts by weight of alcohol dissolve nearly four parts of Opium, and the whole of its active parts. Water, cold or warm, dissolves about two-thirds of it, including a great part of its active ingredients, and forms a deep reddish-brown infusion; the residuum consists chiefly of a substance analogous to caoutchouc, with a considerable portion of narcotin. Sulphuric ether chiefly dissolves narcotin, which may be obtained in fine crystals on evaporation. The concentrated mineral acids disorganize Opium; but the diluted acids, both mineral and vegetable, are powerful solvents, and exhaust it entirely of its active principles.

Probably, no drug has undergone more chemical examinations than this, and yet but very little was known concerning it, until in 1803, when Derosne published his discovery of a crystalline matter, which has latterly been termed "narcotin." In 1804, a new crystalline substance was detected by Seguin, but he did not acquaint himself with its true character. Sertuerner, a Hanoverian chemist, discovered meconic acid and morphia in Opium, in 1804, and in 1812 made the first decidedly successful analysis of this drug; since which, several chemists have ascertained its composite character. It contains as its most important constituents, morphia, codeia, narcotin, narceia, meconin, paramorphia, and meconic acid; beside which, there have been found in it sulphuric acid, a brown acid extractive, resin, fat oil, gummy matter, bassorin, caoutchouc, albumen, a volatile odorous principle, lignin, sulphates of lime and potassa, acetic acid, iron, alumina, phosphoric acid, pseudo-morphia discovered by Pelletier, papaverina by Dr. G. Merck, opiana by Dr. Hinterberger, and glucose by M. Lahens. Altogether some twenty-eight or thirty principles.

Inferior Opium has a very dark color, a soft consistence, somewhat adhesive, a dusky, not glossy fracture, a diversified structure, with more or less impurities, a feeble odor, or like that of burnt oil, and a mawkish, disagreeable, bitter taste. It colors the saliva dark-brown, leaves marks of a pale-brown color upon paper over which it is rubbed, and forms an aqueous mucilaginous solution.

There are many agents which cause precipitates when added to solutions of Opium, without impairing their efficacy; but those which are undoubtedly *incompatible* are the vegetable astringent acids, and alkalies or their solutions.

Opium is very subject to adulterations, which are practiced before it is imported into this country. Sand, dust, stones, oil, extract of Poppy, and various other substances are employed for the purpose. Some of these impurities can be detected by ocular inspection, but others are more difficult to distinguish. Many purchasers rely almost entirely on external characters, as color, odor, taste, texture, moisture, and freedom from mechanical admixtures; but these constitute fallacious criterions. If morphia be found in any suspected mass, or meconic acid, it will be an evidence of the existence of Opium, although its quality will not be thereby determined. The tincture of chloride of iron will impart a red color to a watery solution of a portion of the mass, if meconic acid be contained in it. The matter may be rendered more certain by the following process: Filter the aqueous infusion of the supposed Opium, and treat it with a considerable excess of a solution of acetate of lead, and set aside in a tall vessel for the precipitate of meconate of lead to subside, the clear liquor holding in solution acetate of morphia. Pour off the supernatant fluid, and collect the precipitate on a filter. Now proceed to test the precipitate for meconic acid, and the clear liquor for morphia, as follows: 1st, suspend the precipitate in water contained in a conical glass, and pass a current of sulphureted hydrogen through it, which precipitates the sulphuret of lead, and which should be removed by filtration. Gently heat the clear filtered liquid, to expel the excess of sulphureted hydrogen, and, if necessary, concentrate by evaporation. [Or add a few drops of diluted sulphuric acid to the meconate of lead, by which an insoluble sulphate of lead is formed, and meconic acid held in solution.] Boiling decomposes the meconic acid. The tests for meconic acid are then to be applied, thus —the *tincture of chloride of iron*, or the *neutral sesquisalts of iron*, will cause a red color with this acid; *nitrate of silver*, *chloride of barium*, or *acetate of lead* will produce white precipitates, *meconates*, which are dissolved by nitric acid; *chloride of gold* does not redden it; and the *ammoniacal sulphate of copper*, in weak solution, gives a green precipitate of meconate of copper. 2nd, To ascertain if morphia is contained in the suspected drug, take the clear liquor first named above and place it in a conical glass, and pass through it a current of sulphureted hydrogen, to precipitate the lead, and then filter. Boil the filtered liquor to remove any remaining sulphureted hydrogen, and, if necessary, concentrate by evaporation. Then test for morphia as follows: If the liquor contain morphia, and an excess of strong *nitric acid* be added to it, it will become red, and the color will be darkened by excess of ammonia, becoming yellow after a short time; (brucia, strychnia, oil of cloves, oil of pimento, etc., are also reddened by nitric acid.) *Tannic acid* causes an insoluble precipitate of tannate of morphia, soluble, however, in acetic acid; *solution of ammonia*, not in excess, produces a precipitate of morphia, which is soluble in alkalies and in an excess of ammonia; *iodic acid* produces a reddish-brown color, and if starch be added, a blue compound is formed, the iodide of starch,—several hours may be necessary for the success of this test; (sulphureted hydrogen, sulphurous acid, phosphorous acid, sulphosinapisin, and other agents, have a similar effect on iodic acid); the *alkaline carbonates* cause a white precipitate; *chloride of gold* causes a yellow precipitate; which when shaken up, and treated with a drop or two of liquor potassa, assumes various hues, as green, blue, violet, and purple.—*P.* Having now ascertained that Opium is present in the mass under examination, the next thing is to ascertain its quality, and this can only be done by extracting its morphia; the amount of morphia obtained is the best indication of its purity. At least ten per cent. of morphia should be extracted from a good article of Opium. The Edinburgh College gives the following test: "Macerate 100 grains of fine Opium for twenty-four hours in two fluidounces of distilled water; filter, and strongly express in a cloth, and treat the filtrate with a cold solution of half an ounce of carbonate of soda in two waters: a precipitate will be produced, which will weigh, when dry, at least ten grains, and which is wholly soluble in a solution of oxalic acid."

The following is Dr. Riegel's test, which is an improvement upon Guillermond's: "Cut up the drug to be examined into small pieces, and bruise half an ounce of it in a mortar with alcohol at 71°; the fluid is then expressed through linen, and the refuse washed with from ten to twelve drachms of the same alcohol; the alcoholic solution is then to be filtered into a glass containing one drachm of spirits of ammonia. In about twelve hours, all the morphia, with some narcotin and meconate of ammonia will have become deposited. The separation of the gritty crystals of morphia, which adhere to the sides of the vessel, from the light, pointed crystals of narcotin, which, for the most part, float in the fluid, is to be effected by decantation, according to Guillermond, but this plan does not leave the morphia free from narcotin. In order effectually to separate the narcotin, the adhering meconate of ammonia must be removed by washing in water, and then shaking the crystals in pure ether, or better still in chloroform, by which the narcotin is readily dissolved, while the morphia remains entirely insoluble. After this treatment, the morphia is left behind in rather large, gritty crystals, slightly discolored. This process may be varied by employing boiling alcohol and powdered Opium, and adding the solution still hot, to the solution of ammonia." He states that by this process 13.50 per cent. of morphia has been procured from good Opium. For the detection of small quantities of Opium he recommends the following process: "To the suspected substance, some potassa is to be added, and then shaken with ether. A strip of white blotting paper is to be moistened with the solution, several times repeated. When dry, the paper is then to be moistened with muriatic acid, and exposed to the steam of hot water; if Opium be present, the paper will be more or less colored red."—*Pharm. Jour. & Trans., Vol. XI., p.* 418, *from Jahrbuch, etc.*

Morphia and some of its salts are treated upon hereafter (See Part II., Morphia). *Narcotin,* or *Narcotina,* is thought to be alkaline by some, who bestow upon it the name of narcotina, and others who view it as a neutral principle, name it narcotin. It was discovered by Derosne in 1803. It may be obtained by treating the residual Opium which has been exhausted by water, with water acidulated with acetic or hydrochloric acid, and precipitating the filtered liquid with ammonia. The precipitate dissolved in boiling alcohol deposits the narcotina as it cools. Or, it may be procured directly from Opium by digesting it in ether which dissolves the narcotina and leaves the morphia; on evaporation the narcotina is deposited. Narcotina crystallizes from alcohol in thin, white, unequally beveled pearly tables, and from ether in regular rhombic prisms; it is without taste, odorless, soluble in ether, boiling alcohol, oils, and diluted acids, insoluble in water, and solutions of alkalies, fuses at 388° with a loss of 0.04 of its weight, but solidifies again at 266° into a crystalline, resinous-like substance, and at a higher heat it is decomposed; when pure it is incapable of forming a yellow solution with nitric acid, or a blue one with sesquichloride of iron. It forms bitter salts with acids which crystallize with difficulty, give an acid reaction, and are soluble in alcohol or ether, but readily decomposed by water, tannic acid, or ammonia. It consists of hydrogen, carbon, nitrogen and oxygen, and its formula is $NC_{46}\,H_{25}\,O_{14}$. Its effects upon the system are but imperfectly known. Magendie states that a grain of it dissolved in olive oil and administered to a dog, was followed by death in about twenty-four hours, while twenty-four grains dissolved in acetic acid diluted produced no effect. It is very probable that pure narcotina does not possess any very active narcotic powers, and that the first experiments were made with an impure article. Three grains of narcotina dissolved in diluted hydrochloric acid, and repeated three times daily, have been strongly recommended as a powerful antiperiodic, acting without occasioning constipation, uneasiness, and cephalalgia, but frequently causing copious diaphoresis.—*Brit. and For. Med. Rev., VIII.,* 263. Narcotina may be distinguished from morphia by the following characteristics: Narcotina is tasteless, dissolved by ether, insoluble in pure alkalies, and does not color the salts of peroxide of iron blue. A few drops of nitric acid added to a solution of narcotin in sulphuric acid, gives to it a blood-red color, while morphia by the same process is colored slightly green. Narcotina mixed with alcohol is precipitated by bicarbonate of potassa, but the salts of morphia are not.

By dissolving narcotin in an excess of sulphuric acid, adding finely powdered peroxide of manganese, and then applying heat, a decomposition ensues, carbonic acid is set free, and opianic acid and cotarnin are produced. *Opianic acid* forms delicate, colorless, minute, prismatic crystals, which are non-nitrogenous, having the formula $C_{20}\,H_8\,O_9+HO$. They are bitter, have a feebly acid reaction, readily soluble in boiling water, ether, or alcohol, hardly soluble in cold water, non-volatile, fuse at 284° F., but without parting with their water of crystallization, and subsequently becomes converted into a white mass, unaltered in composition, but not capable of being dissolved by alcohol, ether, dilute alkalies, or water. Opianic acid forms crystalline, soluble salts, with bases, and may be converted into *hemipinic acid*, *opian-sulphurous acid*, *sulpho-pianic acid*, and *opiammon*, by various chemical actions.

"*Cotarnin* is an organic base formed simultaneously with opianic acid. After the opianic acid, resulting from the decomposition, as above-stated, of narcotin, has subsided, a reddish-yellow fluid is left. If to this fluid a solution of chloride of platinum be added, cotarnin is precipitated as a double, reddish-yellow, crystalline salt. By the addition of sulphureted hydrogen to this precipitate suspended in water, an insoluble sulphuret of platinum is deposited, while the hydrochlorate of cotarnin remains in the solution. Filter, add solution of baryta, evaporate, and to the residue add alcohol to remove the cotarnin. It forms groups of dark-yellow, star-like crystals, which are readily dissolved by alcohol, ether, water, and solution of potassa, and are fusible at 212° F., parting at the same time with about seven and a half parts of water of crystallization; their solution in nitric acid is dark-red; their aqueous solution is feebly alkaline, and gives precipitates with the salts of peroxide of copper, and of iron. The formula of cotarnin is $NC_{26}\,H_{12}O_5+HO$. *Propylamin*, $NH_2\,C_6\,H_7$, may be procured by adding an excess of hydrated potassa to narcotin, and exposing the mixture to a heat of 428° F. It has an ammoniacal odor, is readily dissolved by water, has a powerful alkaline reaction, and when dissolved in hydrochloric acid it gives a light-yellow precipitate on the addition of chloride of platinum. *Humopinic acid*, $C_{48}\,H_{23}\,O_{17}$, is a deep-brown, non-crystalline body, formed by decomposing narcotin at 428° F. It forms a dark yellowish-red solution with alcohol, yellow with alkalies, and is not dissolved by dilute acids, or water. *Apophyllenic acid* is supposed to be a product formed by the decomposition of cotarnin. It is sometimes found in the residue left after cotarnin has been dissolved by alcohol from the baryta mixture formed by evaporation, as above described. *Narcogenin*, $N_2\,C_{72}\,H_{38}\,O_{20}$, is found only in combination with chloride of platinum, forming elongated acicular crystals of a pale-yellow or orange color; it is decomposed by ammonia and heat, and if an attempt be made to remove it from its combination with the salt of platinum, it is converted at once into cotarnin and narcotin."—*Chem. Gaz. II.*, 49.

Opianine (*opiania*).—A newly discovered alkaloid in Opium by Dr. Hinterberger. Engler, a pharmaceutist of Vienna, who, for the purpose of procuring morphia, precipitated an infusion of Egyptian Opium by the addition of ammonia; the precipitate was washed, first, in cold water, then in cold alcohol, after which hot alcohol was added to dissolve it, and animal charcoal to remove the color. The mass of morphia thus procured was mixed with a large quantity of crystals, presenting the appearance of narcotina; upon dissolving it in hot alcohol, the crystals separated on cooling, and the morphia remained in the mother-liquor. Dr. Hinterberger examined the crystals and found them to be a new alkaloid, for which he proposes the name, opianine. It crystallizes in long, colorless, transparent and brilliant needles; is precipitated by ammonia from its solutions, as a white, impalpable powder; is insoluble in water; very sparingly soluble in boiling alcohol, from which it separates entirely upon cooling; is inodorous, and its alcoholic solution possesses a strong and persistent bitter taste, and a marked alkaline reaction. Solutions of its salts give a white, flocculent precipitate of opianine on the addition of an alkali. The hydrochlorate of opianine forms double salts with chlorides of platinum and mercury. Opianine is unaltered by concentrated sulphuric acid; nitric acid dissolves it with a yellow color. Sulphuric acid containing nitric acid communicates a blood-red color, which after some time becomes bright yellow. Its formula is $C_{66}\ H_{36}\ N_2\ O_{21}$. It is a narcotic closely resembling morphia in its action.—*Jour. Pharm. & Trans. Vol. XII.*, p. 498.

Codeia, is a white, crystalline solid, first discovered in Opium, in 1832, by M. Robiquet. When the purified commercial hydrochlorate of morphia is precipitated by ammonia, the mother-liquor on evaporation yields a salt exactly like the hydrochlorate of morphia, but which is a double salt composed of the hydrochlorates of morphia and codeia. This is to be digested with aqua potassa which dissolves the morphia and leaves the codeia as an oily viscid mass, which, on cooling, consolidates into crystals. It may be further purified by ether in which it dissolves; and by the addition of a little water, and spontaneous evaporation, it crystallizes in a state of purity. Codeia is dissolved by water, ether, or alcohol; 1000 parts of water at 59° F., dissolve 12.6 parts of it; at 110° F., 37 parts; and at 212° F., 58.8 parts. Its aqueous solution, when slowly evaporated, deposits very large octohedrons; these when heated, melt and lose their water of crystallization. It has a bitter taste, and is decidedly alkaline; at 300° F., it fuses without decomposition, and at a high temperature burns with flame without residue. It is not colored red by nitric acid, nor blue by perchloride of iron. Pereira, however, states that all the codeia he has met with becomes orange-yellow on the addition of nitric acid. Alkalies do not dissolve codeia; acids are neutralized by it, and form crystallizable salts, as the nitrate, sulphate, and hydrochlorate. Tannic acid precipitates codeia from its solutions, forming tannate of codeia. Its formula is Co= $C_{35} H_{20} NO_5$. It seems to possess anodyne properties, and its salts often cause general and violent itching of the surface; perhaps, codeia is the cause of the itching which often follows the use of Opium, and of the common hydrochlorate of morphia, which latter salt contains 1-30th of codeia. The pure hydrochlorate of morphia does not produce this effect.—(*Gregory.*) Its therapeutical influence upon the system is imperfectly known.

Thebaina, or *Paramorphia*, was discovered in 1832, by M. Thiboumery the superintendent of Pelletier's chemical establishment. M. Pelletier announced it under the name of *paramorphia;* but on a subsequent analysis of it by M. Couerbe in 1835, he called it "thebaina." When an infusion of Opium is acted on by excess of lime, the morphia is dissolved and the residue yields, when dissolved in diluted acid and precipitated by ammonia, a powder which, when dissolved in alcohol or ether, leaves thebaina on evaporation. It forms in colorless crystals, has a sharp, metallic taste, and an alkaline reaction. It dissolves in alcohol and ether, is nearly insoluble in water, and unites with acids forming amorphous salts. At 302° F. it fuses, but decomposes at a higher heat. It is not colored by the persalts of iron, nor does nitric acid color it, but dissolves it after having first converted it into a soft resinous-like substance. According to Kane its formula is $C_{25} H_{14} NO_3$. Its action on the system is not known.

Pseudomorphia is a substance occasionally met with in Opium, and discovered by Pelletier. It is solid, white, sparingly soluble in water, insoluble in alcohol or ether, soluble in alkalies, acetic, and hydrochloric acids. Like morphia, it is colored blue by the persalts of iron, and red by nitric acid. It crystallizes in shining scales. Its formula is given as $C_{27} H_{18} NO_{14}$. Its effects on the system are not fully known. Pelletier believes it to be a combination of morphia with a substance neutralizing its poisonous properties.

Narcein, was first procured in 1832 by Pelletier; it may be obtained by exhausting Opium with cold water, evaporating to an extract, dissolving this in boiling water, which leaves narcotin as a brilliant crystalline deposit. Strain off the liquid, heat to 212° F., and add ammonia in slight excess. Boil for a time to drive off the excess, and on cooling morphia is deposited, and a crust of which also floats on the surface. Remove the morphia, evaporate the fluid to one half, and on cooling more morphia is deposited. To the liquid thus freed from morphia add solution of baryta, which occasions a precipitate of meconate of baryta; filter, and to the liquid add solution of carbonate of ammonia to throw down any excess of baryta which may be present. Again filter, heat the liquid to expel any excess of carbonate of ammonia, and evaporate to the consistence of thick syrup, and leave it for some days in a cool place. The pulpy mass formed is placed upon paper to dry, and then strongly pressed between folds of cloth to free it from a black viscid matter. Then treat it with boiling alcohol, which partly dissolves it. Concentrate the alcoholic tincture by distillation, and on cooling crystals of narcein are deposited, which may be easily purified, by repeated solutions in water and crystallizations.—*T.* Narcein forms in white, delicate four-sided prisms, of a silky luster, and having the appearance of needles. It has no odor, and a slightly bitter taste, somewhat like that caused when the tongue is placed between a plate of zinc and one of silver, held in contact with each other. It dissolves in 230 times its weight of boiling water, or in 375 times its weight of water at 57°. It is very soluble in alcohol, but is not dissolved by ether which may be added to it in order to remove any meconin which may be contained in it. It dissolves in diluted acids without neutralizing them, and the solutions on evaporation deposit unaltered narcein. At 198° F., it melts, and on cooling concretes into a white translucent mass, marked with crystalline vegetations. The strong acids, as well as substances which have a strong attraction for water as the chloride of calcium, color it azure-blue; but the salts of iron do not produce this effect. Iodine forms with it a compound of a blue color. Its therapeutical properties are not known. Its formula is given as $C_{28} H_{20} NO_{12}$.

Meconin was discovered by M. Dublanc, Jr., in 1826, and again in 1830 by M. Couerbe, who was unacquainted with Dublanc's previous examination of it. It may be procured by exhausting Opium with cold water, filtering, and concentrating to the specific gravity of 1.05. Then add ammonia, diluted with five or six times its weight of water, as long as a precipitate continues to fall, and which consists chiefly of morphia. After a few days, decant the supernatant fluid, and wash the precipitate with water as long it comes away colored. Mix the several waters, and evaporate to a syrupy consistence, and place them in a cool place for 14 or 15 days. Decant the liquid from the granular crystals deposited, press them between folds of blotting-paper, and then still further dry them by a gentle heat. To this brown crystalline mass, add boiling alcohol, sp. gr., 0.837, and when every thing soluble is taken up, filter and evaporate the alcoholic solution to one-third its original bulk. On cooling, crystals of meconin are obtained. Dry these by expression, dissolve them in boiling water, digest the solution with animal charcoal, and filter. On cooling, meconin is deposited, which must be freed from narcein by ether, which dissolves only the meconin. By spontaneous evaporation, meconin is deposited in a state of purity.—*T.* It forms fine white, six-sided prisms, terminating by dihedral summits, and which are inodorous, at first tasteless, but afterward acrid. It is soluble in alcohol, ether, and in 266 parts of cold water, and 18½ of boiling. At 194° F., it melts and assumes the form of a colorless limpid fluid, and may be sublimed unchanged. When heated with water it first melts into an oily fluid, and gradually dissolves.

Sulphuric acid diluted with half its weight of water dissolves meconin, forming a colorless solution; if heat be applied, the liquid becomes dark-green. Water throws down from the green solution brown flocks, which dissolve in alcohol with a rose-red color. From this alcoholic solution, the salts of alumina, lead, and tin throw down fine red lakes. By the action of chlorine gas on fused meconin, the latter becomes blood-red, and then deep-yellow, mechloic acid is formed, and a yellow, resinous-like substance, containing much chlorine. Nitric acid, aided by a gentle heat, converts meconin into *hyponitromeconic acid.* Meconin is neutral, destitute of nitrogen, and has the formula $C_{10} H_5 O_4$.

Meconic acid, $C_{14} HO_{11}$, is prepared by digesting Opium in four times its weight of distilled water for twenty-four hours, at a gentle heat, expressing, and then treating twice with the same quantity of water. The expressed liquids are then allowed to subside, strained, and caustic ammonia added so long as a precipitate is formed. This is collected on a filter, the yellowish filtrate carefully evaporated in a porcelain dish to a syrupy consistence, mixed with a concentrated solution of chloride of calcium, equalling in quantity $\frac{1}{16}$th of the Opium employed, boiled with it, and set aside to cool. After standing some days, the partially solidified mass is washed with cold water, the residual meconate of lime pressed, dried, and weighed. One part of this is rubbed with ten parts of water, previously heated to 140° F., but not higher, and hydrochloric acid, sp. gr. 1.130, added until the meconate of lime has dissolved (a little sulphate may have formed and render the solution turbid); then filter. On cooling, acid meconate of lime crystallizes; this is collected, dissolved in warm water, and decomposed with half as much hydrochloric acid as the meconate of lime weighed. After standing for half an hour, at a temperature of 140° F., it is allowed to cool, and the meconic acid crystallizes out. When, on gently evaporating the mother-liquor, etc., all the acid is obtained, it is again dissolved in warm water, which separates still more sulphate, filtered, and set aside to crystallize; about $\frac{1}{32}$ of the weight of Opium employed is thus obtained in crystals of meconic acid.—*Witt.* Meconic acid forms colorless, glistening, transparent scales, which are odorless, have a sour, cooling taste, afterward bitter, loses its water when warmed, then fuses, and, if further heated, evaporates, forming carbonic acid, water, and pyromeconic acid. It is soluble in four times its weight of hot water, and in alcohol. Nitric acid quickly converts meconic acid into oxalic and carbonic acid. Cold sulphuric or muriatic acid does not alter it. The salts of peroxide of iron are reddened by it, which color is destroyed by alkalies, nitric acid, and protochloride of tin. The ammoniated sulphate of copper in a dilute solution gives with it a green precipitate of meconate of copper. It forms white meconates which are dissolved by nitric acid, with nitrate of silver, chloride of barium, and acetate of lead. Chloride of gold does not redden it. It is supposed to be an inert substance.—*P.*

Papaverina, $Pa = NC_{40} H_{21} O_8$, is an alkaloid procured by adding soda to a watery infusion of Opium, treating the precipitated morphia with alcohol, evaporating the brown extract, digesting the residue with dilute hydrochloric acid, and precipitating the filtrate with ammonia. This precipitate is added to hydrochloric acid, and the solution, mixed with acetate of potassa, to which, after washing with water, boiling ether is added; the ether dissolves the papaverina, and deposits it on cooling. Pure papaverin crystallizes from alcohol in confused, aggregated, acicular, white crystals; from ether they are larger. They are not soluble in cold water, nearly insoluble in cold alcohol or ether, but more readily soluble when these liquids are hot, but precipitated in crystalline form on cooling. When treated with concentrated sulphuric acid, the crystals become blue. They form salts with acids, difficultly soluble in water. They dissolve in hydrochloric acid, and on the addition of more acid, a white precipitate is formed at first, which collects into drops, and forms at the bottom of the vessel an insoluble oily layer. If left standing, crystals are formed, partly in the oil, partly in the supernatant liquid, which for some time augment, until the whole of the oily liquid is converted into a mass of well-shaped crystals of several lines in length. A gentle heat promotes the crystallization. Both sulphuric and nitric acid behave toward it like hydrochloric, but the crystals are not so large. Papaverin resembles narcotin, but is distinguished chiefly by its salts, and their unequal, dissimilar, oleaginous and crystalline nature.—Dr. Geo. Merck, *Pharm. Jour. and Trans.*, *VIII.*, 293.

Porphyroxin is a new principle obtained from Bengal Opium, but which requires further investigation. It crystallizes in brilliant needles, is insoluble in water, soluble in alcohol, ether, and dilute acids, is neutral, and is converted into a beautiful purple solution with hydrochloric acid.

Properties and Uses.—Opium is a narcotic and stimulant, acting under various circumstances as a sedative, antispasmodic, febrifuge, diaphoretic, and an inspissant of the mucous secretions. Topically, it is a direct stimulant and indirect sedative of the nervous, muscular, and vascular systems. A medium dose taken while in health, augments the volume and velocity of the pulse, increases the heat of the surface, gives energy to the muscles, renders the mind more acute, and produces a general excitement of the whole system; the brain is especially acted upon, the faculties becoming more clear, the ideas brilliant, precise, and under control, the power of application more intense, the conversational energies augmented, and frequently a state of frenzy or hallucination is induced. After a time this stimulation abates, leaving a calm, careless, indifferent, pleasurable sensation, with a series of obscure, fleeting ideas, which is succeeded, after a longer or shorter period, by sleep, which may continue for several hours, and is followed by giddiness, languid pulse, sickness at stomach, cephalalgia, tremblings, want of appetite, and other indications of derangement of the nervous system. Other effects likewise occur during the period of its influence upon the system, thus—the mucous secretions become suspended, constipation is induced, the cutaneous secretion is increased, the urinary and biliary secretions may be unaffected, or merely inspissated, in consequence of their discharges being impeded. The retention of urine, and constipation, sometimes exist for several days. Generally, no serious results occur from this action of Opium, except from a repetition of the dose, so often as to impair the vital powers by continuous over stimulation. The unpleasant symptoms following the sleep caused by Opium may be removed by lemon-juice, strong coffee, or a cathartic.

The effects of Opium vary in different persons, and not unfrequently in the same individual under dissimilar circumstances. In some persons the smallest dose will cause nausea, emesis and gastro-intestinal spasm; in others it will occasion feverishness, headache, watchfulness, restlessness, startling, disagreeable visions, delirium, anxiety, and afterward an aggravated degree of the more familiar subsequent effects of this drug; these phenomena constitute what is called the *idiosyncratic action of Opium.* Though commonly the result of idiosyncrasy, yet these symptoms are often induced in persons with whom Opium in general agrees. Lemon-juice or vinegar renders the action of Opium more favorable, and less liable to produce the above disagreeable consequences. An unpleasant prickling sensation on the surface of the body, or a troublesome itching, occasionally accompanied with a slight eruption, is sometimes produced by Opium, or its salts of morphia. The narcotic power of Opium is lessened by certain states of disease, as in the advanced stage of pneumonia, or peritonitis, by profuse hemorrhage, especially uterine, by severe dysentery, delirium-tremens, some varieties of mania, tetanus, and severe pain or spasm of any kind. It is also modified by the conjunction of other remedies; camphor is thought to diminish the chance of its subsequent or idiosyncratic effects; and given with ipecacuanha, three or four times the ordinary hypnotic dose may be administered without inducing sleep, but with the effect of bringing on sweating with much greater certainty. Through whatever channel Opium is introduced into the body—the stomach, rectum, a wound, vein, excoriation, blistered surface, etc.,—its remote action is exerted on the brain. It acts most energetically when it is promptly absorbed; yet it has not been detected in the blood. When Opium, or any of its preparations, is applied freely to a blistered, excoriated, or inflamed surface, its effects should be attentively watched, for dangerous accidents have occasionally happened in this way.

In large doses, Opium is a poison, producing death if the proper remedies are not promptly and unremittingly resorted to. The state of stimulation and vivacity, if caused at all, is of short duration, being speedily followed by depression of the circulation, and of the functions of the brain, as manifested by diminution of the frequency of the pulse, prostration of muscular power, slow, soft respiration, flaccidity of the extremities, languor, drowsiness, torpor or coma, pale features, excessively contracted pupils, coldness of the limbs, generally retention of urine, and frequently profuse perspiration, together with an almost entire apathy to external agencies. This state ends in death, unless speedily relieved. The remedies are, emetics of mustard and lobelia-seed, with strong coffee, stomach-pump, external counter-irritation, cold applications to the head and spine, forced exercise, galvanism, and artificial respiration. As soon as the stomach has been properly evacuated by emesis, internal stimulants must be administered, the best of which are brandy and carbonate of ammonia. As soon as consciousness is once fairly restored, an active cathartic, with the continuation of the forced exercise, generally completes the cure. The same toxicological treatment should be pursued in case of poisoning by any of its salts of morphia. Opium is employed internally in form of pill, powder, tincture, or solution. In addition to the laudanum, and paregoric elixir of the pharmacy, other forms of preparation are used, which it may be proper to notice here.

Sydenham's Laudanum is a vinous tincture of Opium, made according to the Parisian Codex, by macerating for two weeks in one pint of Sherry Wine, two ounces of Opium, one ounce of Saffron, and one drachm each, of bruised Cinnamon and Cloves; then filter. A fluidrachm of this laudanum is equivalent to three grains of Opium.

Rousseau's Laudanum is made by exposing a vessel, in which six ounces of Honey have been dissolved in one and a half pounds of Hot Water, to a temperature of about 80° F., until fermentation commences; then add two ounces of good Opium previously diffused in one pound of Water, and again expose to a temperature of about 80° F. for a month; express, filter, and evaporate to five ounces, to which one ounce of alcohol should be added. Six drops of this preparation are equivalent to one grain of Opium.

Black, or Quaker's Drop, is variously made; the Edinburg formula is: "Take of Opium four ounces, Distilled Vinegar sixteen fluidounces. Cut the Opium into small fragments, triturate it into a pulp with a little of the vinegar, add the rest of the vinegar, macerate in a closed vessel for seven days, and agitate occasionally. Then strain and express strongly, and filter." The aromatics added in some formulæ are unnecessary.

These three preparations owe their virtues chiefly to the acetate of morphia contained in them, and are inferior to solutions of the citrate, acetate, or sulphate of morphia.

The special uses of Opium are so numerous, that it is impossible to do more here than mention the most important of them. In all febrile and inflammatory diseases, it is given either alone, or in combination with ipecacuanha to produce diaphoresis. As an anodyne-diaphoretic this combination is likewise beneficial in rheumatic, neuralgic, and gouty diseases, in nervous irritability, morbid vigilance, restlessness, diarrhea, and dysentery. As an antispasmodic in asthma, colic, cholera, hysteria, tetanus, dyspepsia, spasmodic and convulsive affections, especially the spasms accompanying the passage of biliary calculi, or which are present during an attack of nephritis or gout. Also to allay cough, soothe pain, relieve nausea, overcome tenesmus, and calm nervous irritability. It is of much utility in checking abnormal and increased discharges, as in chronic catarrh, excessive secretions from the pulmonary mucous membranes, diarrhea, uterine and other hemorrhages, etc. Indeed it will be found valuable in all symptoms or forms of disease characterized by pain, wakefulness, inflammation, increased nervous excitability, increased mucous secretions, or spasmodic action. Opium should not be used internally in cases of excessive inflammatory action, without having first allayed this action considerably, by other means; or, if Opium be administered, it should be combined with ipecacuanha, as in the Comp. Powder of Ipecac. and Opium, for the purpose of modifying its influence and promoting a determination to the surface. In phrenitis, cerebral congestion, accumulation of blood in the vessels of the head, inflammation of mucous tissues with diminished secretion, and in ordinary states of costiveness, its employment is not proper. If the costiveness be due to spasmodic action, it may then be given as an antispasmodic in combination with a laxative. Opium is often eaten by persons until it becomes a habit exceedingly difficult to overcome; when taken to excess in this manner it may be known by the deadly pale or sallow aspect, with tokens of emaciation, and a gradual loss of the energies and activity of the whole system. De Quincy in his work entitled "Confessions of an English Opium-eater," states that he has taken 8,000 drops of laudanum, or 210 grains of Opium daily; and attributes his cure of this lamentable vice to the use of the Ammoniated Tincture of Valerian as a substitute for his opiate stimulant. Probably any other stimulant would have answered the same purpose.

Externally, Opium is employed chiefly to subdue pain, and arrest local inflammatory action; it is applied in the form of lotion, liniment, or plaster, and is of service in neuralgia, rheumatism, some forms of cutaneous disease, irritable blistered surfaces, diseased mucous surfaces, and in erysipelatous inflammations. It is likewise added to topical preparations for inflammation of the eye, and to gonorrheal injections. There is much variety of opinion among physicians as to the use of this drug as a medicine, some contending against its use, and others in its favor. That it is a useful agent in many diseases, and exerts an influence not possessed by any other one, no person will attempt to deny; neither does it, when given in the proper medicinal doses, leave the seeds of after disease in the system, as is the case with arsenical, mercurial, and other preparations, which in small doses decompose the constituents of the body; therefore, although its present results may be disagreeable, yet, as they are not permanent, there is no good reason why we should dispense with an agent so well calculated to lessen the effects of disease upon the human system. When we administer the almost death-like prostrating emetic, lobelia, the energetic, prostrating, and nauseating hydragogue, podophyllin, etc., etc., it is too much like prejudice without reason to oppose Opium because its effects continue for a few days, or improper doses and carelessness in its use have resulted in death, and which may, in a degree, be said of every active remedy in the Materia Medica.

Poppy capsules are much weaker in their action than Opium: they are occasionally used in the form of syrup or decoction among children, but are in every way inferior to Opium itself prepared similarly. The decoction, or the Poppy capsules are much used as an emollient and anodyne, for fomentations.

A *Syrup of Poppies* may be made by depriving of their seeds, Poppy-heads *nine ounces;* reduce them to a coarse powder, moisten them thoroughly with diluted alcohol, and digest for forty-eight hours; then transfer the whole to a percolator, and gradually pour upon it Diluted Alcohol until two pints of filtered liquor are obtained; then evaporate by means of a water-bath to eight fluidounces, filter, add Sugar *fifteen ounces;* proceed in the manner directed for simple syrup. When cool, add Best French Brandy *two fluidrachms*, and mix.—*C. W. Epting.*

Dose of Opium in pill or powder from one-fourth of a grain to three grains, according to its influence upon the patient, the character of the disease, and the object to be accomplished. Sometimes larger quantities are given, as in severe tetanic, or other nervous affections, and in cases of severe pain. The medium dose to ease pain and produce sleep, is one grain. The dose of the tincture is from ten to fifty drops. When it can not be taken by mouth, as in cases of persistent vomiting, and in strangury, severe pain accompanying diseases of the kidneys, bowels, or uterus, and painful tenesmus, it may be injected into the rectum with much benefit, adding to it a small quantity of water, flaxseed or elm infusion, starch water, mucilage of gum Arabic, etc. When thus given the quantity may be twice that exhibited by the mouth—yet the practitioner should be cautious, as some patients are more powerfully influenced by it than others.

Off. Prep.—Enema Opii; Linimentum Capsici Compositum; Linimentum Opii; Mistura Camphoræ Composita; Pilulæ Camphoræ Compositæ; Pulvis Ipecacuanha et Opii; Tinctura Opii Compositus; Tinctura Opii Acetata; Tinctura Opii Camphorata; Tinctura Serpentaria Compositæ.

PARTHENIUM INTEGRIFOLIUM.

Cutting Almond.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Necessaria.

THE ROOT.

Description.—This plant, also known by the name of *Nephritic Plant*, is indigenous and perennial, with an erect, striate, pubescent *stem*, from three to six feet in height. The *leaves* are alternate, lance-ovate, hispid-scabrous, coarsely dentate-crenate, coriaceous, lower ones petiolate, upper sessile, sometimes clasping; they are from four to twelve inches long, and about half as wide. *Radical petioles* a foot long. *Heads* many-flowered, tomentose, corymbed; *ray-flowers* five, somewhat ligulate, fertile; *disk-flowers* tubular, sterile. *Involucre* hemispherical, five-leaved; *scales* in two series, outer ovate, dilated, inner orbicular; *receptacle* minute, conical, chaffy; *achenia* five, obovate, compressed, cohering with two contiguous paleæ. It is sometimes known as *Prairie Dock.*—*W.*

History.—This plant grows in the Middle and Western States, in dry soils, flowering from July to September. The root is the part used. It growth is singular; it issues from a head or caudex, at first small, but gradually increases in size, and terminates very abruptly, giving off other roots of a similar form, each being a distinct root, about the size and shape of a radish, but growing horizontally, and sending up stems from near the large ends of the principal roots, which are blackish outside, and bluish-gray within. Cold water extracts its medicinal virtues. It has not been analyzed.

Properties and Uses.—Diuretic. A cold infusion of the root, in wine-glassful doses, three or four times a day, will be found very beneficial in heat of the urine, strangury, dysury, gonorrhea, gravel, and diseases of the kidneys and bladder generally. It is highly recommended by some practitioners in these diseases. Likewise said to be an aromatic bitter, and stimulant. The flowering tops have been used as an antiperiodic. Two fluidounces of their infusion has no unpleasant influence on the nervous system, and are said to be equal to twenty grains of sulphate of quinia. *Houlton.*

PETROLEUM.

Petroleum.

A BITUMINOUS FLUID, ISSUING FROM THE EARTH.

History.—Petroleum is a natural combustible liquid, which issues from the earth with springs, on the surface of which it floats, or it may exude direct from several formations, especially those of the rock salt. It is composed of liquid and solid constituents, and according to the preponderance of these, it approaches the fluid naphtha, or the hard and brittle asphaltum. It is met with in abundance on the shores of the Caspian Sea, in Persia, in Birmah, and in different parts of Europe, especially in Italy and Germany. It also occurs in several of the West India Islands, especially Barbadoes and Trinidad. In North America it is found in the State of New York on the borders of Seneca Lake, in Kentucky, Virginia, Pennsylvania, Ohio, etc.

Petroleum varies much in its appearance and character, according to its place of origination. The West India Petroleum, known as *Barbadoes tar*, or *Barbadoes Petroleum*, is of a dusky greenish-brown, or black color, and has a strong, peculiar, not agreeable bituminous odor and taste, and is of the consistence of cream or thick syrup. Its specific gravity, according to Thomson, varies from 0.730 to 0.878. It is insoluble in water, alkalies, acids, or alcohol; and is soluble in fixed and volatile oils, and ether, which latter becomes green when shaken with it. Its liquidity is increased by heat, and at a high heat naphtha passes over, leaving asphalt or pitch naphtha behind. Its ultimate constituents are carbon and hydrogen, with a small proportion of oxygen and nitrogen. *Seneca Rock*, or *mineral oil*, the several names given to the Petroleum of this country is not so thick, nor so dark colored as the Barbadoes variety, neither is its taste and smell so strong. It is considerably used as a popular local remedy for rheumatism, painful affections, sprains, etc., and has been recommended internally in several diseases.

The *Rangoon petroleum* is of a similar color with that of the *Barbadoes*, sometimes having a reddish-tint; it has a semi-solid consistence, a rather agreeable odor, and at a temperature of 80° or 90° becomes liquid. Its chemical actions are similar to those of the Barbadoes. By distillation it yields a large amount of naphtha and paraffine.

Naphtha is a carbo-hydrogen, which is obtained by the distillation of coal-tar or petroleum, and is also found existing naturally, as in Persia, Amiano, etc. It is nearly colorless, transparent, highly inflammable, and exceedingly volatile. It burns with a yellow flame, giving off considerable smoke, and boils at 185° to 194°. When pure its specific gravity is 0.755, and its formula $C_6 H_5$; and it is employed for the purpose of preserving potassium and sodium, which have no action on it in the absence of water. It communicates its odor to water without being dissolved in it; alcohol dissolves about one-fifth its weight of naphtha, and ether, oils, pitch, and Petroleum combine with it in every proportion. By the aid of heat it dissolves wax, a portion of which is deposited on cooling; with caoutchouc it forms a gelatinous varnish. It is decomposed by nitric or sulphuric acids, and forms an oily substance with chlorine. Dr. Andreosky asserts to have used it with benefit in Asiatic cholera, in doses of ten or twenty drops in two or three fluidounces of wine, or mint water.

Asphaltum, also known as *mineral pitch*, *pitch of Judea*, occurs in great abundance in different countries, especially in Trinidad, in Hanover, and at the Dead Sea in Palestine. Its color is black, with a shade of red, gray, or brown; it has very much the appearance of pitch, and is very friable. It is insoluble in acids, alkalies, water, and alcohol, and soluble in oils, oil of turpentine, Petroleum and ether. It is composed of a dark brown resinous substance mixed with a volatile liquid oil, *petrolene* $C_{20} H_{16}$, or, a brilliant black matter, *asphaltene*, $C_{20} H_{16} O_3$, probably an oxide of the former. On account of its insolubility in acids, etc., the *asphalte varnish* forms a useful microscopic cement for mounting objects to be preserved in certain fluids, and for cementing thin glass to slides for micro-chemical experiments. Coal-tar or pitch is of similar utility.

Petroleum is sometimes adulterated with oil of turpentine. M. Saladin states that 1-30th of turpentine in the Petroleum may be easily detected by rubbing a few grains of iodide of potassium and a little water with the suspected naphtha, when, if turpentine is present, the water acquires a yellow or even orange-red color. Dr. Bolley places the suspected Petroleum in a tall cylindrical glass vessel, and, by means of a tube dipping to near the bottom, passes a slow current of muriatic acid gas, which has been thoroughly dried by passing it through a bottle filled with fragments of chloride of calcium. The current is to be continued about an hour, and if even five per cent. of oil of turpentine is present, crystalline artificial camphor will be seen after a lapse of ten or twelve hours. Turpentine may also be thus detected in oil of amber.

Properties and Uses.—Petroleum appears to possess stimulating properties, and has been recommended as a remedy in various diseases. A mixture composed of sixteen drops of Petroleum and twenty-four drops of tincture of assafœtida, to be taken at one dose, and repeated three times a day, has been advised in the treatment of tape-worm. Petroleum has also been recommended in various diseases of the lungs and air-tubes, when not accompanied with inflammatory symptoms. Externally, it has been employed as a stimulating embrocation in lepra, psoriasis, and other scaly diseases of the skin, chronic rheumatism, chilblains, local paralysis, etc. Its dose is from ten to thirty drops, in wine, milk, syrup, etc.

British oil is composed of four fluidounces, each, of oil of turpentine and oil of linseed; two fluidounces, each, of oil of amber, oil of juniper; one and a half fluidounces of Barbadoes Petroleum, and half a fluidounce of American Petroleum or Seneca oil.

PETROSELINUM SATIVUM.

Parsley.

Nat. Ord.—Apiaceæ or Umbelliferæ. *Sex. Syst.*—Pentandria Digynia.

ROOT.

Description.—Petroselinum Sativum, *Hoffman*, or Apium Petroselinum, *Linnæus*, is a biennial plant with a fleshy, spindle-shaped root, and a round, striated, erect, smooth, branching *stem*. The *radical leaves* are biternate, bright-green, on long channeled petioles; the *leaflets* are rhomboidal-ovate, wedge-shaped at the base, deeply incised, with the segments mucronate and sometimes rounded. The *upper leaves* gradually become more entire and narrower, till the uppermost are simply ternate with linear segments. Umbels terminal and axillary, pedunculated, with five to eight rays. *General involucre* none, or one or two subulate minute bracts; *partial involucre* with six or eight setaceous bracts, much shorter than the pedicels, erect, forming a perfect whorl. *Flowers* white or greenish; *petals* rounded, incurved, scarcely emarginate; *calyx* with the limb obsolete; *disk* short, conical, somewhat crenulate; *styles* diverging. *Fruit* ovate, about a line long, compressed, pale greenish-brown, the back occupied by three elevated, pale primary ridges, the two others quite on the margin at the side. *Stamens* longer than the corolla.—*L.*

History.—Parsley is a European plant, but is reared in nearly all parts of the civilized world as a culinary vegetable. The plant has a grateful aroma. The root is the officinal part, it has rather an agreeable odor, and a saccharine, slightly spicy taste, and should be used while fresh. Its properties are due to a volatile oil, and are extracted by hot water, wine, alcohol or ether.

M. M. Joret and Homolle obtained from Parsley seeds, an essential oil, a fatty crystallizable matter, pectin, chlorophyll, tannic acid, a yellow coloring matter, lignin, various salts, and an active principle which they have named *Apiol.* It is obtained by treating pulverized Parsley seed with alcohol of 70 or 80 per cent., by a displacement apparatus; when it is sufficiently exhausted the tincture is deprived of color by passing it through a bed of animal charcoal, and then distilled into a vessel holding about three quarts of alcohol. The residue is absorbed by ether or chloroform, and separated by a second distillation. Heat is applied until all traces of these menstrua are driven off, and then the product is mixed by trituration with one-eighth of its weight of litharge, and left to stand twenty-four hours. After which it is filtered through a light bed of charcoal, and the apiol is obtained pure, presenting the appearance of a yellow liquid, oleaginous, staining paper like fixed fats, although heat will drive off the stain, which will brown before the rest of the paper, and lose its transparency. It has a peculiar, tenacious odor, and an acrid, biting taste, is soluble in alcohol of from 50° to 90°, in ether, and in chloroform in every proportion. It yields nothing to boiling water, and throws off gaseous bubbles when potassium is thrown into it. In doses of from seven to fifteen grains it occasions a cerebral excitement similar to that caused by coffee, a sensation of vigor and composure, and warmth about the stomach; in doses of from thirty to sixty grains it causes intoxication, giddiness, flashes of light, vertigo and ringing in the ears, etc. It is highly recommended as a substitute for quinia in intermittent fevers, and has proved very efficacious.

Properties and Uses.—Diuretic. Very useful in dropsy, especially that following scarlatina, and other exanthematous diseases. Also used in retention of urine, strangury, and gonorrhea. Parsley seeds have a powerful odor, somewhat like that of turpentine, and a spicy, pungent taste, and have been used as carminatives, and for the same purposes as the root—they are said to be very poisonous to the parrot. The seeds, as well as the leaves, sprinkled on the hair, in powder, or in the form of an ointment, will effectually destroy vermin; the leaves, applied as a fomentation, will, it is asserted, cure the bites or stings of insects. The leaves, bruised, are a good application to contusions, swelled breasts, and enlarged glands—reputed to "dry up the milk" of wet-nurses. The oil is efficacious as a diuretic, in doses of three or four drops a day; dose of the infusion, two to four fluidounces, three or four times a day.

Off. Prep.—Infusum Petroselini.

PHOSPHORUS.

Phosphorus.

Preparation.—Take Animal Bones, those of sheep are preferred, and ignite or calcine them in an open fire till they become white, so as to destroy their animal matter, and burn away the charcoal derived from it, in which state they contain nearly four-fifths of phosphate of lime. Reduce the calcined bone to a fine powder, and to *ten parts* of this powder add *thirty or forty parts* of Water, and gradually stir in *six parts* of concentrated Sulphuric Acid. After twenty-four hours, *fifty or sixty parts* of water are added to the mixture, and the whole well stirred and digested for a day or two. The liquid is then strained and evaporated to the consistence of thick syrup, and is then acid phosphate of lime. It is now mixed with one-fourth its weight of powdered charcoal, placed in an iron pot, and dried by exposure to a dull red heat. This dried mass is then placed in a stoneware or iron retort, the neck of which ends in a wide bent tube which dips a little under water, in a bottle or receiver, and is gradually heated to whiteness. Half of the phosphoric acid in the acid phosphate of lime is deoxidized by the charcoal, and Phosphorus is set free, which distills over and condenses under the water. Owing to the presence of water in the mass, part of the phosphorus is disengaged in combination with hydrogen, forming a spontaneously combustible gas. Care must, therefore, be taken to avoid explosions. The action of the charcoal on the phosphoric acid is thus represented: $PO_5 + C_5 = 5CO + P$. Carbonic oxide gas, CO, is therefore disengaged in large quantity. The Phosphorus, first obtained, is usually of a reddish-brown color, owing to the presence of phosphuret of carbon, formed during the process; to purify it, it is melted under water, and while liquid squeezed through chamois leather (or by a second distillation), which separates impurities. It is lastly melted under water, in funnels with long cylindrical necks, stopped below. Into the necks of these funnels the Phosphorus runs, and when cold may be pushed out in the form of solid cylinders.—*Gregory.*

M. Donavan has offered a process which facilitates the preparation of Phosphorus. It is as follows: Take beef or sheep bones as they are found in commerce, with their natural quantity of fatty matter and moisture. Digest them for four hours in a mixture of one part of nitric acid of commerce, and ten parts of water. This dissolves the calcareous salts, leaving the soft gelatinous tissues which retain the form of the bones, and which may be washed and employed in the manufacture of glue. The acidulated liquid containing the phosphate and nitrate of lime, is to be treated with an excess of neutral acetate of lead, and the precipitated phosphate of lead washed and dried. It is then put in a covered crucible, and heated to redness to condense its volume, which operation requires great care, else the phosphate will lose its pulverulent form and fuse, requiring a difficult pulverization. The dense pulverulent phosphate of lead is then intimately mixed with one-sixth of its weight of charcoal, previously calcined, and afterward distilled in the ordinary manner in large earthen retorts, properly heated.—*Am. Jour. Pharm. XXIV.*, 167. Wöhler obtained phosphorus by distilling two parts of bone-black with one of quartz sand at a white heat. The silicic acid of the sand decomposed the phosphate of lime contained in the bone-black, and disengaged the phosphoric acid which was deoxidized by the carbon.

History.—Phosphorus was accidentally discovered in 1669, by Brandt, a chemist of Hamburg, as he was attempting to extract from human urine a liquid capable of converting silver into Gold. In the year 1769, Gahn discovered it in bones, and very soon after, Scheele invented a process for obtaining it from them, which is the process commonly pursued, with a few improvements. It is a constituent of animals, being found in the bones, urine, nerves, brain, etc.; it is also found in various vegetables, combined with lime, potash, or iron, etc. It is also met with occasionally in the mineral kingdom.

It is usually of a light amber color, and semitransparent; though when carefully prepared it is colorless and transparent. It crystallizes in regular octohedrons and rhombic dodecahedrons. Its sp. gr. is 1.896; its equivalent weight 32; at 32° F. it is brittle, but at ordinary temperatures is somewhat flexible. At 94° F. it is very brittle, and may be easily pulverized; at 110° F. it melts and forms an oily-like liquid. If air be excluded, it evaporates at 219°, and boils at 482°. It is a non-conductor of electricity. It is tasteless, but has a garlicky odor, and in the atmosphere its fumes are luminous in the dark, in consequence of slow combustion. It should be preserved in a well-stopped vessel, filled with water, and kept in the dark, for when exposed to the light it becomes yellow, or even brown, externally. It is not soluble in water, but is more or less soluble in alcohol, ether, oils, sulphuret of carbon, and chloride of Phosphorus; from the latter liquids it is often deposited in crystals. Frightful injuries have sometimes been inflicted upon the hands by bringing them in contact with it under exposure to the atmosphere. Heated in oxygen, Phosphorus burns with a light so dazzling that the eye can not endure it. In contact with chlorine, bromine, or iodine, without the aid of heat, combustion takes place spontaneously, while the Phosphorus combines with these metalloids; its union with iodine may yet be found a very valuable remedy in many diseases.

Phosphorus combines very readily with oxygen, giving rise to four compounds, viz.: Oxide of Phosphorus, $P_3\ O_2 = 86.28$, Hypophosphorous acid $PO = 55.14$, Phosphorous acid PO_3 in the anhydrous state, or $PO_6\ H_3$ in the hydrated state, and anhydrous Phosphoric acid $PO_5 = 71.465$.

There are three different Hydrated Phosphoric Acids: Metaphosphoric, or Monobasic Phosphoric Acid, $PO_6\ H=80.478$. Pyrophosphoric or Bibasic Phosphoric Acid, $PO_7\ H_2=89.491$, and Common or Tribasic Phosphoric Acid, $PO_8\ H_3=98.504$. Diluted Tribasic Phosphoric Acid is officinal, as well as the phosphates of soda, iron, and lime.

Under the influence of direct solar rays or violet light, colorless Phosphorus becomes red or amorphous Phosphorus, formerly supposed to be an oxide of Phosphorus. Kept under water and exposed to diffused daylight, Phosphorus acquires a white opaque covering, the nature of which is not satisfactorily solved. And when Phosphorus is heated to 140° or 158°F., and then suddenly cooled to 32° F. it sometimes becomes black.

Phosphorus sometimes contains arsenic or sulphur, or both. A solution of pure Phosphorus in diluted nitric acid yields, with a solution of barytic salt, a precipitate which is soluble in excess of nitric acid. But if the precipitate be insoluble in this acid, the presence of sulphuric acid, formed by the oxidation of sulphur, may be inferred. Arsenic may be detected by converting the Phosphorus into phosphoric acid by boiling in nitric acid; dilute the solution with water, and pass sulphureted hydrogen through it; if arsenic be present, a yellowish precipitate is obtained.—*Pereira.* The best Phosphorus is colorless, resembles wax, is translucent, luminous in the dark, and breaks with a short crystalline fracture, and may be bent seven or eight times in different directions without breaking, for the three hundredth part of sulphur added to it, renders it friable.

Properties and Uses.—In minute doses, and properly diluted, Phosphorus becomes absorbed and acts as a stimulant to the nervous, vascular and secreting organs. It excites the mental faculties and the sexual feelings, raises the temperature of the skin, increases the frequency of the pulse, and promotes the secretions. In large doses it operates as a poison, causing gastro-enteritis, becomes absorbed, and produces convulsions, insensibility and death. It should never be given in the solid form, as it is apt to produce serious results. It has been used as a stimulant to the nervous centers in convulsive and old paralytic cases, and in low fevers; as an aphrodisiac in the impotency of old and debilitated subjects; and as a cutaneous stimulant in some exanthematous diseases in which the eruption has receded from the skin. It has also been recommended in various chronic nervous affections occurring in debilitated patients. Phosphorus may be exhibited as follows: Take of Phosphorus, cut in pieces, four parts; sulphuric ether, two hundred parts; mix, and macerate in a darkened bottle, or in a dark place for one month; then add one hundred parts of oil of cinnamon, or any other oil, and mix thoroughly together. Decant this into blackened ounce vials, and have them well stopped; the dose is from ten to fifteen drops, every three or four hours, in some syrup, or mucilaginous fluid. Chloroform forms an excellent solvent for Phosphorus; one ounce by weight will dissolve two drachms of phosphorus, of which from three to five drops may be given every six hours in syrup, mucilage, or wine. Another mode of preparing Phosphorus for internal exhibition, is to dissolve dry Phosphorus, cut into small pieces, six grains, in four fluidrachms of almond oil, freshly prepared. Dissolve the Phosphorus in the oil by agitating the vial containing the mixture, at the same time keeping it warm by occasionally holding the vial in warm water; about two grains of the Phosphorus will be dissolved. The dose is from five to ten drops, in syrup or mucilage.

Persons engaged in the manufacture of lucifer and Congreve matches are occasionally liable to necrosis of the jaw-bone. Dr. Von Bibra thinks that the deleterious effects are due to hypophosphorus acid contained in the atmosphere of the manufactory; the best preventives are good ventilation of the rooms of the manufactory, and personal cleanliness.

Phosphorus is very useful for destroying rats, mice, cockroaches, bugs, and other vermin; the following paste is considered the best for this purpose, as it does not ferment on keeping: "Triturate to liquefaction six parts of Phosphorus and one part of pure sulphur, with six parts of cold water, that is, added in portions; afterward mix in two parts of mustard flour, ten parts of cold water, eight parts of sugar, and twelve parts of rye flour. Stir it to the consistence of a soft paste, and keep it in pots closely stopped."—*Am. Jour. Pharm., XXVII., p.* 473.

In poisoning by Phosphorus, the stomach should be evacuated as speedily as possible by an emetic, after which magnesia in water may be given freely and largely, in order to neutralize the Phosphorus and phosphoric acids which may be formed.—*Pereira.* X. Landerer has been successful in saving a child who had eaten largely of Phosphorus in paste, by the free administration of calcined magnesia, in sweetened water. The child was out of danger in eight hours. The following, administered in copious draughts, has been recommended as an antidote to Phosphorus: Calcined magnesia 4 grains; chlorine water 16 grains; distilled water 224 grains; mix. Phosphorus is seldom employed in American practice.

Off. Prep.—Acidum Phosphoricum Dilutum.

PHYSALIS VISCOSA.

Ground Cherry.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE BERRIES.

Description.—This plant, also called *Yellow-henbane*, is indigenous, perennial and pubescent, having a herbaceous, decumbent *stem*, about a foot high, and which is often viscid as well as the whole plant. The *branches* are somewhat dichotomous and angular. The *leaves* are very variable, even in the same plant, solitary or in pairs, ovate, or lanceolate-ovate, cordate or acute at base, often obtuse at the apex, repand-toothed or entire, petiolate, from one to four inches in length, and one-half, or two-thirds as broad, or even of equal breadth; when they occur in pairs, one of them is much smaller. The *flowers* are solitary, axillary, pendulous; the *corolla* is campanulate-rotate, twice as long as the calyx, tube very short, limb obscurely five-lobed, greenish-yellow, with five brownish spots at base inside. The *calyx* is five-cleft, persistent, enlarged, inflated, angular; *stamens* five, connivent; *anthers* opening lengthwise. *Fruit* a yellow or orange-colored berry, inclosed in the calyx. There are many varieties of this plant, some of which have been unnecessarily divided into species, as P. Obscura, P. Pubescens, P. Pennsylvanica, and P. Philadelphia.—*W.*—*G.*

History.—This plant is common in many parts of the country, and is found growing in dry fields, hill-sides, and road-sides, flowering in July and August. Its root is fusiform, white, and bitter, and will probably act as a bitter tonic; the fruit or berries are slightly acid and edible, with a faint bitterness. Water or proof-spirit extracts their properties.

Properties and Uses.—Tonic, laxative, and diuretic, said also to be sedative. The juice of the berries, or a strong infusion is reputed very beneficial in gravel, difficult urination, and several urinary disorders. Dose of the juice of the berries, one or two fluidounces. It will be found very useful in febrile and inflammatory diseases attended with considerable vascular excitement, high-colored or scanty urine, restlessness or wakefulness, and torpor of the bowels.

The *Physalis Alkekengi*, or Winter Cherry, of Europe, with the stem somewhat branching below, the leaves in pairs, entire, acute; flowers white; calyx of the fruit red or reddish, with acid and somewhat bitter berries, and growing about a foot high, possesses similar properties, and is likewise recommended as a febrifuge.—*W.*

Dessaignes and Chautard have obtained the bitter principle of the *Physalis Alkekengi*, which they call *Physaline* and which has been employed with success in intermittent fever. An alcoholic extract of the plant was prepared, which yielded a bitter dark-colored mass; the bitter principle was taken up by cold water, and was separated either by means of charcoal, from which it was afterward dissolved by alcohol, or by shaking the aqueous solution with chloroform. The bitter principle thus obtained was pulverulent, slightly colored, and very bitter. When pure, *physaline* is a white powder, with a faint tinge of yellow; its taste is at first faintly, afterward permanently bitter; it is noncrystalline, softens at 356° or 374°, and then soon decomposes, burning with a smoky flame. It is sparingly soluble in cold water, to which it communicates a bitter taste; more soluble in hot water, chloroform and alcohol; and sparingly soluble in ether and acids. It is dissolved by ammonia, and remains unaltered after its volatilization; is not precipitated by nitrate of silver and ammonia from the alcoholic solution, but is precipitated by an ammoniacal solution of acetate of lead. They give its formula as $C_{28}H_{32}O_{10}$. The fruit of the Physalis contains citric acid.

PHYTOLACCA DECANDRA.

Poke.

Nat. Ord.—Phytolaccaceæ. *Sex. Syst.*—Decandria Decagynia.

THE ROOT, LEAVES AND BERRIES.

Description.—This plant is known by various other names, as *Pigeon-berry*, *Garget*, *Scoke*, *Coakum*, etc. It is indigenous, with a perennial *root* of large size, frequently exceeding a man's leg in diameter, usually branched, fleshy, fibrous, whitish within, easily cut or broken, and covered with a very thin brownish bark or cuticle. The *stems* are annual, about an inch in diameter, and from five to nine feet in height, round, smooth, and very much branched; when young they are green, and become of a fine deep purple when matured. The *leaves* are scattered, petiolate, ovate-oblong, smooth on both sides, ribbed underneath, entire, acute, and five inches long by two or three in breadth. The *flowers* are numerous, small, greenish-white, on long pedunculated racemes opposite to the leaves, sometimes erect, and sometimes drooping. *Peduncles* nearly smooth, angular, ascending; *pedicels* divaricate, sometimes branched, green, white, or purple, having a small linear bract at base, and two others in the middle. *Calyx* whitish, consisting of five round-ovate, concave, incurved sepals. *Stamens* ten, somewhat shorter than the sepals, with white, roundish, two-lobed anthers. *Ovary* green, round, depressed, ten-furrowed. *Styles* ten, short, recurved. *Berries* in long clusters, dark-purple, almost black, round, depressed or flattened, marked with ten furrows on the sides. *Cells* ten; *seeds* ten, solitary; *embryo* curved in a ring around the albumen.—*L.*—*W.*—*B.*—*G.*

History.—Poke is a native of the United States, growing in nearly all parts, along hedges, in neglected fields, and meadows, along road-sides, moist grounds, etc., and flowering from July to September. It is likewise found growing in the northern parts of Africa and in southern Europe. The early sprouts are often used for greens, but become cathartic as they advance to maturity. Over forty per cent. of caustic potassa can be obtained from the ashes of this plant, which alkali exists in the plant as a neutral salt, being combined with some vegetable acid; the ashes are said to have been successfully employed as a local application to cancer. The officinal parts of this plant are the root, leaves, and berries. The *root* which is more commonly employed, should be gathered in the latter weeks of autumn, cleansed from dirt and impurities, sliced transversely, and carefully dried. As met with in the shops it is in thin slices, of a pale-brown color rather darker externally, hard, corrugated, and distinctly marked internally with concentric rings of considerable thickness. It is inodorous, with a mild, rather dulcet taste, succeeded by considerable acridity. Water at 212° F., or alcohol extracts its medicinal properties. Mr. E. Donelly found it to consist of gum, resin, starch, sugar, tannic acid, a small portion of fixed oil, woody fibre, etc.—*Am. Jour. Pharm., XV.*, 169. The *leaves* should be gathered just previous to the ripening of the berries. The *berries* must be gathered when they are fully matured; they have a disagreeable, mawkish taste with a faint degree of acrimony, and are nearly inodorous. They contain an abundance of a beautiful dark-purple juice, which is the most delicate test of acids hitherto observed; an alkali turns it yellow, while an acid re-instates its purple color, but it is of a very fugitive nature, changing in a few hours, and losing its delicacy as a reactive. No mordant has yet been discovered to fix it. It appears to contain sugar, will ferment, and yield a fluid from which alcohol may be obtained by subjecting it to distillation.

Properties and Uses.—Poke is emetic, cathartic, alterative, antiherpetic, and slightly narcotic. In doses of from ten to thirty grains it acts both as an emetic and cathartic; but it is seldom used for these purposes, on account of its tardy action, which when established, continues for some time. It rarely causes cramps or pain, but occasionally induces giddiness, double vision, and other narcotic symptoms. Large doses produce powerful emeto-catharsis, with loss of muscular power,—occasionally spasmodic action takes place, and frequently a tingling or prickling sensation over the whole surface. In doses of from one to six grains it acts as an alterative. The root excites the whole glandular system, and has been highly extolled in syphilitic, scrofulous, rheumatic, and cutaneous diseases. The extract of the root is an excellent remedy for the removal of those severe pains attending mercurio-syphilitic affections (osteocopus) in which it is more beneficial than opium. The root roasted in hot ashes until soft, and then mashed and applied as a poultice, is unrivaled in felons and tumors of various kinds. It discusses them rapidly, or, if too far advanced, hastens their suppuration. Care must be had in powdering the root, as it sometimes occasions headache, purging, prostration of strength, and all the symptoms of a severe coryza. The root or leaves finely powdered, and added to lard to form an ointment, in the proportion of sixty grains to an ounce of lard, is very efficacious in scald-head, itch, and many other obstinate skin diseases, occasionally causing a slight degree of irritation when applied.

An infusion of the leaves taken internally is slightly cathartic; when bruised and applied locally, they are beneficial in indolent ulcers. A strong decoction of the leaves is of much benefit in hemorrhoids; injected into the rectum two or three times a day, and a fomentation of the leaves applied to the part, will almost always give relief, and eventually effect a cure. A fluidrachm or two may be taken internally at the same time, and repeated two or three times a day; should any narcotic effects be produced, its use may be omitted for a day or two, and then commenced in smaller doses. The inspissated juice of the leaves has been recommended in indolent ulcers, and as a remedy in cancer; in this last disease, Dr. Bone combined it with gunpowder.

A saturated tincture of the berries has been successfully employed in chronic rheumatism. It is also recommended in the same diseases as the root. Dose of the powdered root, as an alterative, from one to six grains; of the tincture, one fluidrachm, three or four times a day; as an emetic, twenty to thirty grains of the powder.

An Institute of the city of New York advertises the active principle of Poke root under the name of *Phytolaccin ;* said to be a light-brown powder, with a pleasant, mucilaginous taste, soluble in water, and insoluble in alcohol or ether. I am not advised of its mode of preparation. Said likewise to be a most powerful alterative, aperient, and slightly narcotic. Dose from one-fourth of a grain to a grain, three times a day. The statement comes from a doubtful source.

Off. Prep.—Cataplasma Phytolaccæ; Decoctum Phytolaccæ; Extractum Phytolaccæ; Pilulæ Phytolaccæ Compositæ; Syrupus Phytolaccæ Compositus; Tinctura Phytolaccæ; Tinctura Cimicifugæ Composita; Unguentum Phytolaccæ; Vinum Phytolaccæ Compositum.

PICRÆNA EXCELSA.

Quassia.

Nat. Ord.—Simarubaceæ. *Sex. Syst.*—Decandria Monogynia.

THE WOOD.

Description.—This is the *Quassia Excelsa* of Linnæus, and the *Simaruba Excelsa* of De Candolle, and is known by the various names of *Lofty Quassia*, *Bitter-wood*, *Bitter-ash*, etc. This is a tree growing from fifty to a hundred feet high, with an erect stem, three feet or more in diameter at base, gradually becoming smaller as it ascends; the bark is grayish and smooth. The *leaves* are alternate, unequally pinnate; *leaflets* opposite, short-petioled, oblong, acuminate, unequal at the base, blunt at the apex, veiny-glabrous. The *flowers* are small, pale or yellowish-green, polygamous; *racemes* toward the ends of the branchlets, axillary, very compound, panicled, sub-corymbose, dichotomously branched, spreading, many flowered. *Peduncles* compressed, downy, rufescent. *Sepals* five, minute. *Petals* five, longer than the sepals. *Filaments of the male flowers* much longer than the petals; in the fertile of the same length. In the male, merely the rudiments of the pistil; in the fertile, ovaries three; *style* longer than the stamens, triquetrous, trifid. *Anthers* roundish. *Stigmas* simple, spreading. *Fruit*, three drupes, one only being perfected, size of a pea, black, shining, fixed on a hemispherical receptacle; *nut* solitary, globose, with the shell fragile.—*L.*

QUASSIA AMARA, or *Bitter Quassia*, is a shrub, or moderately sized branching tree, having a grayish bark. The *leaves* are alternate, unequally pinnate; *leaflets* in two pairs, opposite, entire, smooth, elliptical, acute at each end; petiole winged, jointed, with the joints obovate. The *flowers* are large, scarlet, distant, hermaphrodite, and are in long, one-sided, simple, terminal, rarely branched racemes. The *pedicels* are bracteate at the base, jointed below the apex, and there having two little bracts. *Calyx* short, five-parted. *Corolla* consists of five petals, longer than the sepals, arranged in a tubular manner. *Stamens* ten, longer than the petals. *Ovaries* five, placed on a receptacle broader than themselves; *styles* five, distinct at the base, there united into a very long one, terminating in a nearly equal five-furrowed stigma. *Fruit* drupaceous.—*L.*

History.—*Quassia Amara* inhabits Surinam, Guaiana, Colombia, Panama and the West India Islands, flowering in November and December. A negro residing in Surinam, named Quassi, had obtained a very great reputation in the cure of endemic malignant fevers of that place. His remedy was kept secret, until in 1756, when he was induced to make it known to Mr. C. D. Dahlbergh. The bark, wood, and root are intensely bitter, and have proved very efficacious in malignant fevers. The medicinal parts of this tree seldom reach this country at present, and the following article is now substituted for it:

Picrœna Excelsa is common on the plains and lower mountains of Jamaica and other neighboring islands; it flowers in October and November, and in the two succeeding months matures its fruit. The wood of this tree furnishes the Quassia of commerce, being substituted for the true Surinam Quassia.

It is imported in large logs, varying from two inches to over a foot in diameter, and from one to six or eight feet in length, occasionally larger than a man's body, and split into quarters, and frequently retaining a friable and feebly-attached cortex, which has similar medicinal powers with the wood. These are undoubtedly obtained from portions of the tree itself, instead of from its root. The wood is very tough, of compact texture, white, but changing to yellow under the action of the air, odorless, excessively bitter, and yields its medicinal virtues to water or alcohol. The bark is thin, dark-brown, or thick, grayish-brown, wrinkled, and traversed by reticulating lines.

Quassin was obtained by Wiggers, as follows: The sliced wood was boiled in water, and the filtered decoction was evaporated to one-fourth of its bulk. After cooling, it was mixed with a quantity of lime-water, and the mixture was frequently agitated for twenty-four hours; the lime separated the pectin and some other substances. The solution was filtered and evaporated to dryness, and the residue treated with alcohol sp. gr. 0.831, which dissolved the quassin, together with some common salt, saltpetre, and a brown coloring matter. The alcohol was distilled off, and the residue evaporated to dryness, when a light-yellow crystalline matter remained, which was dissolved in as small a quantity of alcohol as possible, and mixed with a little ether. This solution was filtered and evaporated, and which solutions and evaporations were repeated till the quassin was obtained pure. Quassin thus obtained is crystallized in very small, white prisms; but for the formation of these prisms, the presence of water is necessary. Its taste is intensely bitter; it has no smell, and is not altered by exposure to the atmosphere. One hundred parts of cold water dissolve only 0.45 of quassin; but the solubility is increased by several salts and vegetable principles. This solution is precipitated white by tannic acid, but not by iodine, chlorine, corrosive sublimate, salts of iron, acetate or subacetate of lead. It is very little soluble in ether. The best menstruum is alcohol, which acts more powerfully the stronger and hotter it is. Hence a saturated solution of quassin in absolute alcohol becomes muddy when a little water is added, and the quassin may be redissolved by adding to the alcohol a sufficient quantity of water. The alcoholic solution is not thrown down by acetate or subacetate of lead; but it is by corrosive sublimate. All its solutions are colorless. It is a neutral body. Sulphuric and nitric acids dissolve it, but do not lose their acid qualities; and the nitric acid of sp. gr. 1.230 may be driven off by heat, leaving the quassin unaltered. When heated, it melts like a resin, and its point of fusion is only a little higher than that of common rosin. On cooling, it forms a translucent, yellowish mass, which is very brittle. When heated to 212° F. in a dry atmosphere, it loses about 1.3 per cent. of its weight; and when fused, the loss amounts to 1.76 per cent. When more strongly heated, it becomes brown and is charred. It is composed of carbon 66.912, hydrogen 6.827, and oxygen 26.261, or $C_{10} H_6 O_3$.—*T.*

Analysis has found in Quassia, volatile oil in minute trace, quassin, gummy extractive, pectin, woody fiber, and various salts, as oxalate, tartrate, and sulphate of lime, chlorides of calcium and sodium, an ammoniacal salt, nitrate of potassa, or, according to Mr. Geo. Whipple, sulphate of soda, which he separated in crystals.

Properties and Uses.—Quassia is tonic, febrifuge, and anthelmintic. It is used sometimes in remittent and intermittent fevers; likewise in dyspepsia, debility during convalescence from exhausting diseases, and for worms. It preserves animal matters from decay, which is a property possessed more or less by all simple bitters. The decoction, administered by way of injection, will remove ascarides. An infusion may be made by macerating for twelve hours three drachms of the rasped or ground Quassia in a pint of cold water; the cold water does not dissolve the extractive matter. Of this a wine-glass half full may be taken three times a day, either alone, or with some ginger tea, and will be found useful for feeble, emaciated persons, with impaired digestive organs. Or an extract made by evaporating the decoction to a pilular consistence, may be given in doses of one grain, three or four times a day, and which will be found less offensive to the stomach than the infusion or decoction. Quassia, in connection with sulphuric acid, enters largely into the composition of an Antibacchanalian Elixir, for the cure of drunkenness, and which does certainly destroy all appetite for alcoholic drinks. On flies and other insects, Quassia acts as a powerful narcotic poison, and the alcoholic extract kills small animals when introduced into the cellular tissue. Mr. Brande, in his work on chemistry, recommends a strong decoction of Quassia, well sweetened with brown sugar or molasses, as an effectual poison for flies, and far preferable to the poisonous articles generally used to destroy them. It is certainly worth a trial. Dose of the powder, thirty grains; of the infusion, from one to three fluidounces; of the tincture, one or two fluidrachms; and of the extract, from two to ten grains. A very excellent injection for worms (*thread-worms*), is a strong infusion of three parts of Quassia, and one of mandrake-root, to every ounce of which a fluidrachm of tincture of assafœtida may be added. For a child two years old, two fluidounces may be injected into the rectum twice a day.

Off. Prep.—Infusum Quassiæ.

PIMPINELLA ANISUM.

Anise.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE FRUIT. ANISEED.

Description.—Anise has a perennial, spindle-shaped, ligneous *root*, and a smooth, erect, branched *stem*, about ten or twelve inches in height. The *leaves* are petioled; the radical ones are roundish, heart-shaped, lobed, cut-serrated; the cauline ones biternate, with linear-lanceolate, rather cuneate-acuminate segments. The *flowers* are small, white, and disposed in umbels on long stalks, nine or ten rayed, naked; partial ones with a few subulate, reflexed bracts. *Calyx* wanting or minute; *corolla* of five, obovate, emarginate petals, with an inflexed lobe. *Stamens* five, longer than the petals. *Anthers* roundish. *Styles* subulate, spreading, long, capitate. *Fruit* ovate, a line and a half long, dull-brown, slightly downy, not at all shining; *half-fruits* or *mericarps* with five filiform, equidistant, elevated ridges, sometimes rather wavy, paler than the channels. *Commissure* broad and flat.—*L.*

History.—Anise originally came from Egypt, and is at present cultivated in many of the warm countries of Europe; the fruit of the Spanish plant is that which is more generally selected for medical purposes. The fruit, popularly called *Aniseed*, is the officinal portion. Aniseed is of an ovate form, slightly flattened at the sides, and composed of two mericarps or half-fruits of a grayish-green, or grayish-brown color, with five paler, primary ridges. In each channel are three vittæ. The odor of Anise is penetrating and fragrant, and the taste aromatic and sweetish.—*P.* Water partially takes up its properties, alcohol wholly so; these are due to a volatile oil which may be procured by distillation of the fruit with water. This oil is contained in the external coat of the seeds, while a green-colored fat oil of a butyraceous consistency is obtained by expression of their inclosed substance. Brandes obtained from the fruit of Anise, concrete fixed oil, green fat oil, resin, azotized matter, sugar, gum, bimalate and binacetate of lime, bimalate of potassa, volatile oil, lignin, silicate of iron, water, gummoin, ulmin of anise, phosphate of lime, extractive, with various salts, etc.

The Star-Anise of cordial manufacturers, possesses a taste and odor similar to the Anise, but is procured from the *Illicium Anisatum*, a plant growing in Eastern Asia. A volatile oil is obtained by distillation, from its fruit, which is often fraudulently substituted for the oil of Anise; it is called *oleum badiani* or *oil of Star-Anise.* Oil of common Anise is sometimes adulterated with spermaceti or camphor, to promote its solidification, the former may be known by its insolubility in cold alcohol, the latter by its odor.—*P.*

Properties and Uses.—A stimulant and carminative; used in cases of flatulency, flatulent colic of infants, and to remove nausea. Sometimes added to other medicines to improve their flavor, correct griping and other disagreeable effects. The dose of Aniseed, crushed or powdered, is from twenty to forty grains.

Off. Prep.—Oleum Anisi.

PINUS PALUSTRIS.

Long-leaved Pine.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE CONCRETE JUICE. (*See Oil of Turpentine.*)

Description.—This tree is also known by the names of *Broom Pine*, *Yellow Pitch-pine*, etc., and is the *Pinus Australis* of Michaux. Its *trunk* rises to the height of from sixty to eighty feet, of which distance about forty or fifty feet below the branches has a diameter varying from twelve to twenty inches; the bark of the tree is slightly furrowed. The *leaves* are in threes, of a bright-green color, about a foot long, and conglomerate at the ends of the branches; the *sheaths* or *stipules* are pinnatifid, scaly, persistent; *buds* very long, whitish. *Sterile aments* violet colored, two inches long. *Strobiles* or *cones* sub-cylindrical, muricate, with small recurved spines, and from eight to ten inches long. *Seeds* with a thin, white testa.—*W.*

History.—This is a native tree, found in the Middle, Southern, and Western States, in sandy plains and woods. Its timber is strong, compact and durable, and is much used by carpenters and workers in wood. From this tree is obtained the principal supply of resin, tar, etc., used in this country. The concrete juice is the *white turpentine* of commerce; it is obtained by cutting a hollow in the tree, a few inches above the earth, and the bark removed for the space of about eighteen inches above it. The turpentine runs into these concavities from March to October, more rapidly, of course, during the warmer months. It is then removed into casks.—*P.* By age it slowly concretes, forming a whitish, nearly hard, resinous-like mass, composed of resin and oil of turpentine. It usually has a yellowish tint, a rather agreeable odor, and a bitter terebinthine taste. When fresh, from fifteen to eighteen per cent. of essential oil may be obtained from it by distillation. It is readily dissolved in alcohol or ether, and combines with the fixed oils. To free it from the impuritie which it contains, it may be melted and then strained.

Venice Turpentine is furnished by the Larix Europæa, or Abies Larix; it is limpid or turbid, with a yellow color, sometimes having a green tint, tenacious, and thick like molasses. Its odor is sweet, citron-like, and its taste hot, pungent, and somewhat bitter. It requires an exposure to the air for many years before it becomes hard and brittle. It contains from 18 to 25 per cent. of oil of turpentine, dissolves slowly in alcohol, and is dissolved by the caustic alkalies. A brown artificial Venice turpentine is frequently met with, which, according to Pereira, is prepared by melting oil of turpentine and black rosin together. See *Abies Larix.*

Chian turpentine is obtained from the *Pistachia Terebinthus.* It is yellowish, greenish, or bluish-green, translucent, viscid, and thick like molasses. Its odor is rather pleasant, and its taste less acrid than most of the turpentines. It gradually hardens by age, and is often adulterated with the cheaper turpentines.

Bordeaux turpentine is obtained principally from the Pinus Sylvestris, and Pinus Pinaster. It is thick, viscid, turbid, grayish-yellow, has a disagreeable odor, and an acrid, bitter, nauseous taste. On standing, it separates into two layers; one thinner, yellow, and almost transparent; another thicker, whitish, and having a granular, thick, honey-like consistence. Bordeaux turpentine solidifies with magnesia, hardens by exposure to the air, and possesses the property of left-handed circular polarization, which is in common with the preceding turpentines.—*P.*

There are several other turpentines named in foreign Materia Medicas, but not being met with in this country it is unnecessary to describe them. Turpentines are oleo-resins; they all possess a certain general peculiarity of taste and smell, yet differing sufficiently to characterize each kind. The most of them concrete by age and exposure, becoming dry and hard, are softened or liquefied by heat, and burn with a dense reddish flame and considerable black smoke. They are more or less soluble in alcohol or ether, combine with fats and fixed oils, and several of them are solidified when mixed with from one thirty-second to one-twelfth part of magnesia.

An adhesive and strengthening plaster may be made as follows: Take of caoutchouc, reduced to fine shreds, five pounds, steep it in hot water to soften; then remove from the water, dry as quickly as possible, place in a vessel, and cover with oil of turpentine, which must be increased in quantity as the caoutchouc absorbs it. When the gum is sufficiently dissolved, press it through a fine sieve, and add to it the following mixtures: 1st, white turpentine, melted and dissolved in a sufficient quantity of oil of turpentine to make it thin enough to strain; 2d, capsicum, four ounces, heated in a quart of oil of turpentine, which must be filtered and gradually added and ground with a pound of litharge, and to which balsam of Peru six ounces, is to be added. This plaster may be spread on paper, linen, or leather.

The *phosgene* which is used in lamps as a substitute for oil, is said to be composed of, alcohol of 100 per cent., four gallons and a half, oil of turpentine one gallon, camphor two ounces. *Burning-fluid* may be made in two different ways: 1st. Add together alcohol of 90 per cent. ten gallons, oil of pine one gallon, camphor four ounces; or 2d. Alcohol 90 per cent. six gallons, phosgene one gallon, oil of turpentine one pint; mix.

Properties and Uses.—The turpentines act as local irritants, occasioning heat, redness, and even inflammation of the skin. Taken internally they act more especially on the mucous tissues, lessening excessive morbid discharges. They have a diuretic influence on the urinary apparatus, imparting to the urine an odor like that of violets. They also act as stimulants on the general system, quickening the pulse, increasing the temperature of the surface, and causing a sensation of warmth at the stomach. They likewise act as anthelmintics. In large doses they act upon the bowels, or, if this effect is not produced, they are apt to cause loss of appetite, nausea, vomiting, griping, strangury, or bloody urine. They may be used in gonorrhea, gleet, chronic affections of the bladder and kidneys, fluor-albus, chronic affections of the mucous membrane of the air-passages, chronic rheumatism, hemorrhoids, intestinal ulceration, tympanitis, amenorrhea, chronic mucous diarrhea, etc. Externally, they are detergents and digestives, and have sometimes been applied to indolent and ill-conditioned ulcers (*P.*); also as rubefacients and stimulants. Their peculiar influence upon the body is chiefly owing to their essential oil. They also enter into various plasters and ointments, especially the white turpentine. The dose is from ten to sixty grains, in the form of pill, emulsion, or electuary. They may be made into pills when too soft by the addition of powdered liquorice root, magnesia, etc.; an emulsion may be made by rubbing them with yolk of egg, or mucilage of gum Arabic, sugar, and some aromatic water; sugar and honey mixed with them forms an electuary.

Off. Prep.—Emplastrum Myricæ; Pilulæ Ferri Compositæ; Unguentum Myricæ; Unguentum Plumbi Compositum; Vinum Phytolaccæ Compositum.

PIPER ANGUSTIFOLIUM.

Matico.

Nat. Ord.—Piperaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES.

Description.—This plant is the *Artanthe Elongata* of Miquel, and the *Stephensia Elongata* of Kunth; it is described as a tall shrub, presenting singular appearance from the segmentary character of its stems and branches. The *leaves* are harsh, short-stalked, oblong-lanceolate, acuminate, pubescent beneath, tesselated or rough on the upper side on account of the sunken veins. The *spikes* are solitary, cylindrical, and opposite the leaves; the *bracts* lanceolate; and the *flowers* hermaphrodite.—*P.*

History.—This is a Peruvian plant, which was brought into notice among the profession of this country by Dr. Ruschenberger, a member of the U. S. Navy. The dried leaves are the parts used; they have a strong, rather fragrant odor, not unlike that of cubebs, and a warm, aromatic, somewhat feebly astringent taste. They are easily reduced to a powder of a color similar to that of senna leaves. Water takes up their aroma and a slight pungency, but no astringency. Infusion of galls produces a gray precipitate with infusion of Matico; the sesquichloride of iron causes a deep green one; tartar-emetic, corrosive sublimate, and gelatin scarcely affect it. Dr. Hodges found in the leaves a soft dark-green resin, chlorophyll, brown coloring matter, yellow coloring matter, gum, nitrate of potassa, a bitter principle called *Maticine*, an aromatic volatile oil, salts, and lignin. Weigand states that Maticin is nothing more than a salt of potassa. Dr. John J. Stell does not believe that Matico contains any principle similar to piperine or cubebine, and that its medicinal virtues depend on the volatile oil and the soft resin.—*Am. Jour. Pharm.*, *XXX.*, 392.

Properties and Uses.—Matico is an aromatic bitter stimulant, whose virtues reside in its resin, volatile oil, and bitter principle. It has been highly recommended in bleeding from the lungs, stomach or kidneys, and in dysentery, but its use is doubtful in these cases. It has, however, been found advantageous in fluor-albus, gonorrhea, piles, and chronic mucous discharges, also in dyspepsia owing to chronic mucous affection of the stomach. Externally, the leaves are used for arresting hemorrhage from wounds, leech-bites, etc.; the downy part of the leaf is said to be the most active part. Also applied to ulcers. A tincture is also used, made with two ounces and a half of the leaves to a pint of diluted alcohol, of which the dose is from one to three fluidrachms. The infusion is made by macerating half an ounce of the leaves in half a pint of boiling water, for one hour; dose, from one to two fluidounces, three or four times a day.

Off. Prep.—Infusum Matico.

PIPER CUBEBA.

Cubebs.

Nat. Ord.—Piperaceæ. *Sex. Syst.*—Diandria Trigynia.

THE BERRIES.

Description.—This is a perennial plant, with a climbing *stem;* the *branches* are round, the thickness of a goosequill, ash-colored, smooth, rooting at the joints; when very young minutely downy, as well as the petioles. The *leaves* are from four to six and a half inches long by one and a half or two inches broad, petioled, oblong, or ovate-oblong, acuminate, rounded, or obliquely cordate at base, strongly veined, netted, coriaceous, very smooth. *Flowers* diœcious, and arranged in spikes at the end of the branches, opposite the leaves, on peduncles the length of the petioles. *Fruit* rather longer than black pepper, globose, on pedicels from one-third to half an inch long.—*L.*

History.—Piper Cubeba inhabits Java and Prince of Wales Island, and other isles in the Indian ocean, growing without cultivation in the forests. The fruit is gathered before it is fully ripe, and when dried is the part used in medicine. The fruit or berries are nearly globular, rough, grayish, somewhat lighter colored than black pepper, of a rather pleasant, aromatic odor, and a hot, bitter, somewhat camphoraceous taste. The cortical portion appears to have been thinner and less succulent than in black pepper, and contains within it a hard, spherical seed, which is whitish and oily. The latest analysis of Cubebs is by Monheim in 1835, who obtained from it, green volatile oil 2.5, yellow volatile oil 1.0, Cubebin 4.5, balsamic resin 1.5, wax 3.0, chloride of sodium 1.0, extractive 6.0, lignin 65, loss 15.5=100.—*P.* The volatile oil is much used in medicine. The powder of Cubebs becomes inert after a time, in consequence of the loss of its volatile oil; hence, it is better to powder them only as required for use.

Cubebin was first obtained by Casola; it is a neutral substance, having a green color and the consistence of turpentine; its taste is sweetish and acrid, soluble in anhydrous alcohol, and ether, insoluble in boiling water, though it gives its taste to that liquid; fuses at 68°, boils at 87°, and congeals at 5°. It may be procured by boiling, one part of Cubebs with four parts of alcohol, filter, press out the liquid and distill off the alcohol. Mix the liquid remaining in the retort, while boiling hot, with acetate of lead; wash and dry the precipitate, and treat it with alcohol. When the alcoholic liquid is evaporated, the cubebin is deposited.—*T.* It may be procured colorless by forming an alcoholic tincture from Cubebs, which have been exhausted of their oil by distillation, evaporating this to an extract, or one-fourth its bulk, adding liquor potassa, washing the residuum with distilled water, and further purifying by solution in boiling concentrated alcohol and subsequent crystallization, repeating this as often as may be required. Some chemists consider cubebin to be identical with piperin; the former, when acted on by sulphuric acid, has a fine crimson color imparted, which remains unchanged for many hours. Englehardt examined a crystalline deposit from an ethereal infusion of Cubebs, which had been kept for some months in a well-closed vessel, and found it to consist of cubebin. However, as cubebin is almost insoluble in ether at the ordinary temperature, it was very probably dissolved by the oils extracted by the ether. In the preparation of this substance according to the general method, there would consequently be a considerable loss resulting from the extraction with ether previous to dissolving the cubebin in alcohol.

Properties and Uses.—Cubebs are mildly stimulant, expectorant, stomachic, and carminative. They act more particularly upon mucous tissues, arresting excessive discharges, especially from the urethra. In large doses they produce increased frequency and fullness of pulse, and augmented heat; occasionally they cause nausea, vomiting, burning pain, griping, or even purging. Sometimes they cause a rash-like eruption on the skin. They exercise an influence over the urinary apparatus, frequently producing diuresis, rendering the urine of a deeper color, with a peculiar aromatic odor. They have been successfully employed in gonorrhea, gleet, leucorrhea, catarrh of the urinary bladder, chronic inflammation of the bladder, abscess of the prostate, chronic laryngitis and bronchitis, dyspepsia due to an atonic condition of the stomach, etc. Generally, it is better to use them after the high inflammatory symptoms have subsided. If they do not afford benefit very soon, they should be used no longer. Christison states that he has known the use of Cubebs to be frequently attended, like copaiba, with an ephemeral synocha, followed by a prompt cessation of the gonorrheal discharge; in which disease they may be given in powder along with water or milk, or made into a paste with copaiba. The following preparations have been successfully used in gonorrhea and gleet:—1. Take of ethereal extract of Cubebs, solidified balsam of copaiba, and carbonate of iron, of each, two drachms, podophyllin half a scruple. Mix, and divide with pills of four grains each, of which one or two may be given three times a day. 2. Take of pulverized Cubebs, podophyllum, white pond lily, of each, half an ounce, Holland gin one pint. Macerate for several days, and give sufficient doses three times a day to act slightly on the bowels. 3. Take of solidified copaiba two ounces, ethereal extract of Cubebs one ounce, oil of juniper, a sufficient quantity. Mix, and divide into pills of four grains each, of which one or two may be taken three times a day. Dose of Cubebs in powder, from half a drachm to a drachm, three times a day; of the tincture two fluidrachms; of the oil from ten to thirty drops.

Off. Prep.—Extractum Cubebæ Fluidum; Oleum Cubebæ.

PIPER LONGUM.

Long Pepper.

DRIED SPIKES.

PIPER NIGRUM.

Black Pepper.

Nat. Ord.—Piperaceæ. *Sex. Syst.*—Diandria Trigynia.

DRIED UNRIPE BERRIES.

Description.—Piper Longum has a woody, perennial *root*, with many-creeping, jointed, round stems, downy when young. *Branchlets* bearing the fruit erect, with the leaves sessile, or nearly so. *Leaves* on the creeping branches largest, stalked, broad-cordate, seven-nerved; on the erect fruit-bearing branchlets amplexicaul, oblong-cordate, five-nerved; all smooth, somewhat wrinkled, pale-green below. *Stipules* of the petioled leaves two, adhering to the petiole, and lanceolate; of the sessile leaves intrapetiolar, single, spathiform. Fertile *flowers* or *catkins* in sessile spikes, opposite a leaf, stalked, erect, cylindrical, imbricated with five or more spiral rows of small, orbicular scales. *Ovaries* sessile, sub-orbicular. *Stigma* three or four lobed. Spike of ripe fruit, sub-cylindrical, composed of firmly united one-seeded drupes.—*L.*

PIPER NIGRUM is a perennial vine with a trailing or climbing *stem*, round, smooth, shrubby, flexuose, dichotomously branched, jointed, swelling at the joints, and often throwing out radicles there which adhere to bodies like the roots of ivy, or become roots striking into the ground. The *leaves* are from four to six inches long, alternate, distichous, broad-ovate, acuminate, of a dark-green color, glossy above, paler beneath, five to seven nerved, the nerves connected by lesser transverse ones or veins, and prominent beneath; *petioles* round, from half an inch to an inch long. The *flowers* whitish, small, not stalked, in spikes opposite the leaves, chiefly near the upper ends of the branches, pedunculate, from three to six inches long, slender, drooping, apparently some male, others female, while sometimes the flowers are furnished with both stamens and pistils; *stamens* three. *Fruit* ripening irregularly all the year round, sessile, the size of a pea, at first green, then red, and afterward black, covered by pulp.—*L.*

History.—PIPER LONGUM is a native of India, growing wild among bushes on the banks of water-courses up toward the Circar mountains; it is much cultivated in Bengal, and throughout Hindostan. The female spikes, dried in the sun, form the Long Pepper of the shops. Miquel has removed this plant from the genus *Piper* and placed it in a new one, Chavica; he states that the Long Pepper is obtained from three species, viz.: *Chavica Pepuloides*, *Chavica Roxburghii*, both of which furnish the Long Pepper of India; and the *Chavica Officinarum*, which produces the Java Long Pepper.

The *India Long Pepper* consists of long, somewhat cylindrical bodies, from an inch to an inch and a half in length, and about two lines in thickness, grayish-brown in color, and covered with little eminences in spiral rows, containing each a seed of the size of a small pin's head. These cylinders are composed of numerous little berries closely united to one another.—*C.* They have a mild, aromatic odor, and an intense, pungent taste. The *Java Long Pepper* is somewhat analogous in taste and odor. M. Dulong analyzed Long Pepper in 1825, and found it to contain piperin, an acrid fatty matter, volatile oil, extractive, gum, starch, bassorin in abundance, a malate and some other salts. The volatile oil is colorless, and has an acrid taste, and an unpleasant odor. It possesses analogous medicinal properties with the Black Pepper, but is rarely used in the United States.

PIPER NIGRUM is a native of the East Indian continent, as well as of many islands in the Indian Ocean, where it is extensively cultivated, as well as in the West Indies. The berries are collected while red, before they have fully matured, and when dried, form the *Black Pepper* of commerce; when allowed to ripen, and then divested of their husks by being soaked in water, dried, rubbed and winnowed, they constitute *White Pepper*, which is less pungent and aromatic than the black. Sumatra and Java furnish the principal portion of the Black Pepper met with in this country and Europe. The berries are roundish, about the size of a currant, corrugated and dark brownish-black externally, with a smooth, hard, whitish seed internally, and of a peculiar aromatic odor, and a fiery, bitterish taste. Alcohol or ether extracts their virtues completely; water only partially. In 1821, Pelletier found in Black Pepper, piperin, a solid, very acrid oil, a balsamic volatile oil, a gummy colored matter, extractive, malic and tartaric acids, starch, bassorin, lignin, and earthy and alkaline salts in small quantities. Lucä found in White Pepper an acrid resin, volatile oil, extractive, starch, albumen, lignin, etc.; Poutet detected piperin. The activity of Black Pepper, as shown by Thomson, is due partly to its volatile oil, which is colorless when pure, has the taste and odor of pepper, a sp. gr. of 0.9932, and absorbs hydrochloric acid abundantly. Its composition is $C_{10} H_8$. The resin of pepper, undoubtedly contributes to its activity; this is very acrid, soluble in ether or alcohol, but not in volatile oils. M. Cahours has discovered a new alkaloid in piperin, to which he has given the name of piperidine. It was obtained by distilling one part of pure piperin with from two and a half to three parts of caustic potassa. The products of this distillation, collected in a cooled receiver, was found to be composed of water, two distinct volatile bases, and a trace of a neutral substance possessing an agreeable aromatic odor. On treating the crude product with fragments of caustic potassa, a light oily matter, soluble in all proportions of water, was separated, and which, submitted to distillation, was almost entirely disengaged between 105° and 101° C. Toward the end of the operation, the thermometer rose rapidly to 210° C., and remained stationary at that point. The most volatile portions, forming more than nine-tenths of the crude material, being submitted to a second rectification, distilled at a temperature of 106° C. It is a colorless liquid, forming crystals with several acids, has a strong odor of ammonia, as well as of pepper, restores the blue color of reddened litmus paper, has a very caustic taste, dissolves in water, which it renders alkaline, and has the formula $C_{10} H_{11} N$—*Am. Jour. Pharm. XXV., p.* 118.

Piperin was first announced in 1819, by M. Œrstedt, of Copenhagen. It may be obtained by Poutet's method, viz.: Concentrate the tincture of Pepper, treat it with a solution of caustic potassa of 20° B., which forms a soap with the oily constituents, then dilute with water, and filter. The piperin, which is left upon the filter, may be purified by dissolving it in alcohol, and crystallizing it. Christison recommends, to exhaust ground White Pepper with cold rectified spirit, by percolation, distilling off most of the spirit, and purifying the crystals which slowly form in the residuum by repeatedly crystallizing them from rectified spirit or pyroligneous acid. Piperin exists in Black, White and Long Pepper. It crystallizes in oblique four-sided prisms, is inodorous, tasteless, and of a straw color; when pure it is white. Christison states that the whitest crystals he could obtain were as acrid as the brown ones, and emitted an intensely irritating vapor when thrown on a heated iron plate. Piperin is only slightly soluble in water or ether, but dissolves readily in alcohol or acetic acid. Dilute sulphuric, nitric, and muriatic acids do not act sensibly on it. But when these acids are concentrated they alter its nature. Sulphuric acid gives it a blood-red color; muriatic acid produces at first an intense yellow, then a red color; nitric acid renders it first greenish-yellow, then orange, and at last red. Its formula, according to Regnault, is $C_{34} H_{19} NO_6$; according to Liebig, $C_{40} H_{20} NO_8$. It is mostly neutral, but forms a compound with hydrochloric acid, which unites with bichloride of platinum.

Properties and Uses.—Black Pepper is a gastro-intestinal stimulant, and is much used as a condiment to improve the flavor of food, and to favor its digestion by stimulating the stomach. It has been advantageously used as a carminative to remove flatulency, and to correct the nauseating or griping quality of other drugs, and is sometimes added to quinia in cases where the stomach, from torpidity or other cause, is not acted upon by the quinia alone. It has been recommended as a remedy in intermittents, but very often fails. *Piperin* is occasionally employed in intermittent fever, but will be found less efficient than the alcoholic extract of Black Pepper. Its use has also been advised in colic, diarrhea, cholera, scarlatina, chronic gonorrhea, and in solution as a wash for tinea capitis. Piperin should not be administered with astringents, as it is thereby rendered nearly inert. Dose of Black Pepper from five to fifteen grains; of Piperin, from one to eight grains.

Off. Prep.—Unguentum Piperis Nigri.

PISTACIA LENTISCUS.

Lentisk.

Nat. Ord.—Anacardiaceæ. *Sex. Syst.*—Diœcia Pentandria.

THE CONCRETE RESINOUS EXUDATION. MASTICH.

Description.—The *Lentisk* or Mastich-tree, is a mere bush, rarely attaining a greater height than twelve feet, and from six to ten inches in diameter. The *leaves* are evergreen, equally pinnate; *leaflets* eight to twelve, usually alternate, with the exception of the two upper, which are opposite, oval, lanceolate, obtuse, often mucronate, entire, and perfectly smooth. *Flowers* very small, in axillary panicles, diœcious; the raceme of the *males* is amentaceous with one-flowered bracts; *calyx* five cleft; *stamens* five; *anthers* subsessile, four-corriered; *females*, raceme more lax; *calyx* three cleft; *ovary* one to three celled; *stigmas* three, rather thick. *Fruit* a very small, pea-shaped drupe, reddish when ripe, with a smooth, somewhat bony nut.—*L.*

History.—This plant inhabits the south of Europe, north of Africa, and the Levant, and abounds particularly on the island of Chios. When transverse incisions are made into its bark in the month of August, a fluid exudes, which soon concretes into yellowish translucent, brittle grains. There are two kinds of it in commerce, the Picked Mastich, and Mastich in Sorts. The former is the finest variety; it is in tears of various sizes, oval, roundish, or elongated, frequently flattened, smooth, pale-yellow, translucent, usually covered with a whitish dust from attrition, brittle and easily pulverized, and of a glassy fracture. The Mastich in Sorts is a coarser kind, and is composed of many tears agglutinated together, varying in color from pale-yellow, to grayish-brown, and black, together with pieces of wood, bark, and sand.

Mastich has a faint, agreeable, balsamic odor, which is increased by heat or friction; its taste is mild, rather pleasant, and terebinthine; it softens when chewed, becoming ductile, gray, opaque, and faintly acrid. At a moderate heat it melts, and at a higher temperature it burns with a clear flame and balsamic fumes. It has a sp. gr., of 1.074, is insoluble in water, but entirely and easily soluble in ether, oil of turpentine, boiling alcohol, or chloroform. Boiling alcohol dissolves from it a resinous acid, to the amount of nine-tenths of its weight, and leaves a white ductile substance possessing properties similar to caoutchouc, and which is soluble in ether, or boiling absolute alcohol. Mastich is composed of a small portion of volatile oil, and resin; this resin consists of about 90 per cent. of a resin soluble in alcohol, called *mastichic* acid, having the formula $C_{40} H_{31} O_4$; and 10 per cent. of a white, elastic, tough resin, insoluble in alcohol, but soluble in an alcoholic solution of mastichic acid, also in ether, and oil of turpentine, called *masticin*, whose formula is $C_{40} H_{31} O_2$. Mastich is sometimes adulterated with various gum resins, etc.

Properties and Uses.—Mastich is seldom employed in medicine. The Turks use it as a masticatory to sweeten the breath and strengthen the gums. It is sometimes employed by dentists to fill the cavities of decayed teeth. The following preparation is recommended for this purpose: Take of pulverized Mastich nine parts, sulphuric ether four parts, mix, and digest for several days, strain it through a cloth, and add native alum, in fine powder, a sufficient quantity to form a plastic mass, with which vials holding about two drachms are to be filled, having first poured into each about thirty grains of camphorated alcohol, and fifteen of essence of cloves. This stopping introduced in the cavity of a carious tooth, first well cleansed and dried, is extremely useful on account of the great degree of hardness it acquires. A solution of Mastich in alcohol, or oil of turpentine, forms an elegant varnish. An ounce of Mastich, and half a drachm of caoutchouc dissolved in four fluidounces of chloroform, and then filtered under cover to prevent the evaporation of the chloroform, forms an elegant microscopic cement.

PIX LIQUIDA.

Tar.

History.—Tar is the dark viscid liquid obtained in the destructive distillation of the waste of fir timber; it is usually prepared by making a conical cavity in the earth, communicating at the bottom with a reservoir. Logs or billets of wood are then placed so as not only to fill the cavity, but to form a conical pile over it, which is covered with turf or earth, and kindled at the top. The admission of air is so regulated, that the wood burns from above downward, with a slow and smothered combustion. The wood itself is reduced to charcoal, and the smoke and vapors formed are obliged to descend into the excavation in the ground, where they are condensed, and pass along with the matters liquefied into the receivers. This mixture is termed Tar, *Pix Liquida.* By long boiling, Tar is deprived of its volatile ingredients, and converted into pitch, *Resina nigra*, or *Pix nigra.*

Tar is a dark-brown, viscid, semi-fluid substance, soluble in alcohol, ether, and the fixed or volatile oils. It dries up slowly when exposed to the air. Water agitated with Tar acquires its odor, and a wine-yellow color, and is impregnated with its oil, and acid, and a trace of creasote. Heat expels from it pyroligneous acid, water, and an impure volatile oil, called Oil of Tar; the residue in the still is pitch. Wood Tar is a very complex substance, nor is its composition yet thoroughly understood; a pyrogenous resin called *pyretine*, a pyrogenous oil, *pyroliene*, acetic acid, and water, are obtained from it. Reichenbach found the oil of Tar to contain creasote, picamar, capnomor, eupion, cedriret, pittacal, and pyroxanthine; pyren and chysen have likewise been found in it. *Paraffin* is a constituent of coal Tar; it is a white solid volatile substance, which has been made, by Prof. E. S. Wayne of this city, as white and as clear as the finest wax; it melts at 110°, distills unchanged at a high temperature, has the sp. gr. 0.870, burns in a wick, with a beautiful clear white light, free from smoke, is not acted upon by the strongest acids or alkalies, and has very little tendency to combine with other bodies, but it may be united by heat with stearin, cetin, beeswax and common rosin; lard and suet separate from it on cooling. Oil of turpentine, and coal naphtha dissolve it with facility, but ether is its best solvent. Efforts are now being made to obtain paraffine from coal, and use it in the manufacture of paraffine candles. According to Lewy it is $C_{20} H_{21}$. There is no doubt but that the several products of the distillation of wood, will be found of great importance, the most of them admitting of useful applications.

Pitch, is a black, firm substance, having a brilliant fracture, softening at 99° F., and melting in boiling water. It is soluble in alcohol, and in alkaline solutions, and consists of pyrogenous resin and colophony.

Tar is made in several northern countries of Europe, and in the United States, especially in North Carolina and Virginia. For Burgundy pitch, *Pix Burgundica*, see *Abies Excelsa;* and for Canada pitch, or gum hemlock, *Pix Canadensis* see *Abies Canadensis.*

Properties and Uses.—Tar is a stimulant, diuretic, and diaphoretic. It has been advantageously used in chronic coughs, chronic bronchial and laryngeal affections; the inhalation of its vapor acts as a stimulant and irritant to the bronchial mucous membrane, promoting its secretion, but is seldom used. It is chiefly used externally as a local application to some cutaneous affections, as porrigo, tinea capitis, lepra, and psoriasis, and also to obstinate ulcers. Internally, the dose of Tar is from thirty to sixty grains, three or four times a day, or even oftener, but it is commonly used in the form of Tar-water. A *Tar-water* has been recommended in cough and bronchial affections, prepared as follows: To half a gallon of boiling water, add one pint of Tar and one pint of honey; stir the mixture, and when cold strain off the liquid. It is stimulant and diuretic, and may be taken three or four times a day, in doses of a wineglassful. It will also be found beneficial as a wash in some forms of cutaneous disease.

B. J. Crew recommends the following: Rub two drachms of oil of Tar with two scruples of carbonate of magnesia, add a portion of fourteen ounces of water, mix well, and then add the balance, filter, and add simple syrup two ounces. The dose is a small wineglassful, three times a day.—*Am. Jour. Pharm.*, *XXVII.*, 13.

Pix Nigra has been used internally in ichthyosis, and certain obstinate diseases of the skin; its dose is from ten to sixty grains, and may be made into pills with flour or other farinaceous substance. Pereira says it may be taken to a great extent, not only without injury, but with advantage to the general health. In piles it has been used with great advantage in the form of the following ointment: take of pitch, wax, resin, each, ten ounces, olive oil, one pint. Melt them together, and express through linen, and when nearly cool, stir in four ounces of Scotch snuff.

Off. Prep.—Emplastrum Picis Compositæ; Unguentum Piperis Nigri.

PLANTAGO CORDATA.

Water Plantain.

Nat. Ord.—Plantaginaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—This is an indigenous perennial plant, known likewise as the *Heart-leaved Plantain.* It is an acaulescent herb, with stout, naked *scapes*, growing from one to two feet in height. The *leaves* are radical, cordate-ovate, broad, smooth, somewhat toothed, thickish, about six inches long, six or eight ribbed below with a thick midrib, and on long stout petioles. The *flowers* are small, whitish, somewhat imbricate, the lower ones scattered, and on elongated spikes which are from six to eight inches long; *bracts* ovate, obtuse. *Calyx* and *corolla* lobes, very obtuse. *Pyxis* a third longer than the calyx, two-celled, with two seeds in each cell.—*G.*—*W.*

History.—This plant grows in moist places, and along the banks of rivers, from New York and New Jersey to Tennessee; also from Ohio to Wisconsin, and flowers from April to August. The root is the part used, and yields its properties to water; it has not been analyzed.

Properties and Uses.—The root of Plantago Cordata is astringent, anodyne, antispasmodic, and anti-emetic. The decoction and extract have been successfully used in Asiatic cholera, checking the disease in a short time; they have likewise proved beneficial in dysentery. The plant is certainly deserving more extended investigation. A poultice of the roots is recommended as an application to old, indolent ulcers, bruises, wounds, etc.; it allays inflammation, and reduces swelling.

Off. Prep.—Extractum Plantaginis Cordatæ Hydro-alcoholicum.

PLANTAGO MAJOR.

Plantain.

Nat. Ord.—Plantaginaceæ. *Sex. Syst.*—Tetrandria Monogynia.

ROOT AND TOPS.

Description.—This is a perennial acaulescent plant with a round *scape* from one to three feet in height, arising from a fibrous *root*. The *leaves* are ovate, smoothish, somewhat toothed, five to seven nerved, each of which contains a strong fiber, which may be pulled out, and abruptly narrowed into a long, channeled petiole. The *flowers* are white, very small, imbricated, numerous, and are densely disposed on a cylindrical spike from five to twenty inches long. Small plants are frequently found with the spikes only half an inch to two inches long, and the leaves and stalks proportionally small. *Stamens* and *styles* long; *seeds* numerous.—*G.*—*W.*

History.—Plantain is a well known herb, growing in rich moist places, in fields, by the road-sides, and in grass-plats, and common in Europe and America. It flowers from May to October. The root has a somewhat sweetish, salty taste; the leaves are bitterish and unsavory. The plant loses its medicinal activity by drying; all its preparations should be made from the freshly gathered root and tops. Water or alcohol extracts the virtues of the plant; it has not been analyzed.

Properties and Uses.—Plantain is alterative, diuretic, and antiseptic, once considered vulnerary. The tops and roots in strong decoction, have been highly recommended in syphilitic, mercurial, and scrofulous diseases, in the dose of from two to four fluidounces, three or four times a day. It is likewise reputed beneficial in menorrhagia, leucorrhea, hematuria, diarrhea, dysentery, and hemorrhoids. The juice taken internally, in doses of one fluidounce every hour, and also applied to the wound, is in high repute as an antidote to the bites of venomous serpents, spiders, and insects. Externally, the bruised leaves, or an ointment made with them, is useful in wounds, ulcers, ophthalmia, salt-rheum, erysipelas, and some other cutaneous affections. The best form of administration is the juice dissolved in diluted alcohol, and evaporated by gentle heat to the consistence of an extract.

PLUMBI ACETAS.

Acetate of Lead.

Preparation.—Acetate of Lead is likewise known by the several names of *Sugar of Lead*, *Superacetate of Lead*, *Saccharum Saturni.* It is prepared by placing thin lead plates into earthen vessels along with acetic acid. The portion of the lead near the surface, and which is exposed to the action of the air, as soon as it is covered with a coat of oxide, is removed to the bottom of the vessels, and new plates, or new surfaces of the same plates, are brought to the surface that the oxygen of the atmosphere may oxidize them. These are incrusted in their turn, when they are also removed to the bottom where the oxide is dissolved. This change of place is continued daily until the acid has dissolved a sufficient quantity of lead. It is then filtered, and sufficiently concentrated by evaporation. As it cools, the Acetate of Lead precipitates in small crystals. Some manufacturers dissolve the carbonate of lead, prepared by exposing the metal to the fumes of vinegar; or they make use of litharge in its stead, and the solution is evaporated in the usual way till the salt crystallizes. Christison says, it may be obtained speedily by sprinkling weak acetic acid over coarsely granulated lead, contained in covered vessels, upon which oxide of lead is immediately formed with the disengagement of heat—then dissolving out the oxide by means of more diluted acid, which is saturated by passing it through several vessels in succession—and repeating the sprinkling and solution alternately until the lead is consumed. Whatever method be followed, it is always necessary that a slight excess of acid be present, in order to obtain a perfect and easy crystallization.

History.—Acetate of Lead is prepared in considerable quantities in this country, England, Holland, and France. The manufacturers distill their own acid in England and Holland from sour beer, and in France from sour wine. The article found in the shops has usually the appearance of a confused white mass of interlaced needle-like crystals, having an acetous odor, and a powerful, sweet-astringent taste. It crystallizes in transparent, colorless, right rhombic prisms, terminated at each extremity by two converging planes placed upon the acute angled edges, or truncated on two edges so as to form six-sided prisms.—*C.* They slightly effloresce in a dry and warm atmosphere, and are liable to decomposition by the carbonic acid of the air, rendering them partially insoluble. The specific gravity of Acetate of Lead is 2.575; it is dissolved by alcohol, 200 grains of alcohol of 0.835 will dissolve 15.7 grains, at 60°; cold water dissolves from one-fourth to three-fifths its weight of it; boiling water still more. When it is dissolved in water, a small quantity of white powder usually falls; it is carbonate of lead, formed by the carbonic acid, which usually exists in water,—a small quantity of weak acetic acid will redissolve this deposit, and render the solution clear. Heated with sulphuric acid, the vapor of acetic acid is disengaged, and sulphate of lead is deposited. When heated, the salt fuses in its water of crystallization; at a heat of 320° its whole water, with a small proportion of its acid, is speedily discharged, and a heavy, white, opaque mass remains: a higher heat fuses it again, decomposes it, and disengages acetic acid, and acetone or pyro-acetic acid; and as the temperature rises further a brownish-black mass is formed, which, when urged with a stronger heat, yields globules of metallic lead.—*C.* In the air-pump vacuum, and with the aid of sulphuric acid or quick-lime to absorb water as it escapes, the Acetate of Lead falls into a white powder, which is completely anhydrous. The constituents of Acetate of Lead are, one atom of acetic acid 51.48, one atom of protoxide of lead 111.6, and three atoms of water 27. Its formula is $C_4\ H_3\ O_3+Pb\ O+3\ HO$, or $A+Pb\ O+3\ A_9$. Acetate of Lead is *incompatible* with alkalies, most of the earths and acids, especially those acids and their compounds which form with lead a salt nearly insoluble in water, as the sulphuric, phosphoric, muriatic, fluoric, oxalic, malic, etc., and partially by even water containing carbonic acid. Acetate of Lead may be known as pure by the following tests: it is soluble in distilled water, from which solution carbonate of soda throws down a white carbonate of lead; iodide of potassium throws down a yellow iodide of lead; hydrosulphuric acid throws down a black sulphuret of lead. It is entirely soluble in distilled water acidulated with acetic acid; 48 grains thus dissolved, are not entirely precipitated by a solution of 30 grains of phosphate of soda. As 30 grains of the latter salt will just decompose 47.66 grains of Acetate of Lead; hence, if 48 grains or a 140th part more of the latter salt be used, the solution will be affected after filtration, by a further addition of phosphate, provided the acetate be tolerably pure.

Properties and Uses.—Acetate of Lead in doses of from one to four grains, every one, two, or four hours, is an efficacious astringent and sedative; it is usually given in pill form. In large doses it is an irritant; and in long continued small doses it may induce the peculiar constitutional action of the preparations of lead. Its best antidote is sulphate of soda, sulphate of magnesia, or phosphate of soda, which should be followed by emetics if necessary, and then by alternate purgatives and opium. Generally an excess is followed by vomiting, which prevents any serious injury, and as long as the bowels are kept regular, its effects upon the constitution are seldom experienced. Large doses have at times been taken, even to several drachms, without occasioning more than severe sickness, some pain in the stomach, vomiting, etc. No fatal case has yet been recorded. Some practitioners make extensive use of it in active or passive hemorrhages from the lungs, bowels, womb, etc., in which it is employed with the view of diminishing the calibre of the bleeding vessels, thereby checking the flow; it is generally given in connection with opium. It has also been exhibited in colliquative diarrhea, chronic dysentery, to check excessive secretion in bronchitis, to remove obstinate mercurial ptyalism, and in gastric irritability attending certain forms of fever. In passive hemorrhages, the following has been found efficient: Take of Acetate of Lead two grains, opium half a grain to a grain, capsicum two grains, form into a pill with conserve of roses, and give one every hour or two; in urgent cases every ten minutes. While administering this agent, the gums should be frequently examined, and as soon as a blue line is observed along their edge, indicative of its constitutional influence, its use should be stopped. Many practitioners, however, denounce its internal administration, and employ it occasionally, in solution, as an external application, in cases of superficial inflammations, as in erythema, erysipelas, spreading inflammation of the subcutaneous cellular tissue, and in many cutaneous diseases. The solution may be made by dissolving a drachm of the salt in five or eight fluidounces of distilled water, to which a fluidrachm of distilled vinegar may be added to prevent the oxide from being thrown down. One or two grains dissolved in a fluidounce of pure water, forms a common collyrium. In inflammations opium is often conjoined with it, four grains of each being added to every fluidounce of water. So much improvement has been recently made in American practice, that we believe even the external use of this agent can be, in a great measure, dispensed with.

Off. Prep.—Lotio Myrrhæ Composita.

PLUMBI OXIDUM RUBRUM.

Red Oxide of Lead.

Preparation.—Red Oxide of Lead, also known by the name of *Red-lead*, *Minium*, etc., is prepared on a large scale by the manufacturing chemists. It is obtained from the protoxide of lead (*yellow massicot*), by exposing it, under the access of air, to a temperature just short of what is required to cause fusion, stirring it occasionally, for a day and a half or upward, and allowing the product to cool slowly. The French prepare it in well-closed tin boxes, and heated to about 600°, and then cooled slowly. It absorbs oxygen and is converted into Red-lead. The finest Red-lead is procured by calcining the oxide of lead obtained from the carbonate.

History.—Red-lead is a tasteless powder, of an intense red color, often inclining to orange, and very heavy, its sp. gr. being 9.096. It loses no sensible weight in a heat of 400°; but when heated to redness, it gives out oxygen gas, and gradually runs into a dark-brown glass of considerable hardness. Red-lead is much used in the manufacture of flint-glass, to give brilliancy and fusibility to the glass. It is insoluble in water. Nitrous acid dissolves it entirely, forming nitrate of protoxide of lead; because the excess of oxygen in Red-lead converts the nitrous into nitric acid. Diluted nitric acid instantly renders it dark-brown, resolving it into two oxides, one of them the protoxide, which is dissolved, and the other the peroxide or binoxide, which remains. It is not very liable to adulteration, though occasionally impurities are found in it. Pure Red-lead is wholly soluble in highly-fuming nitrous acid; partially soluble in diluted nitric acid, a brown powder being left. When Red-lead is acted upon by nitric acid, and the solution gives a black precipitate with tincture of galls, red oxide of iron is present. Gelis and Fordos propose to detect adulteration by boiling the suspected article in water, with sugar and a small quantity of nitric acid; the Red-lead is entirely dissolved if it be pure, leaving the foreign matters. According to Dumas, the Red-lead of commerce is a mixture or compound of pure Red-lead, the deutoxide of lead, and the protoxide. Red-lead does not unite with acids or alkalies; nitric acid converts it into the protoxide and peroxide of lead. Chemists differ as to the constitution of Red-lead; it is generally considered to consist of three equivalents of lead and four of oxygen, so united as to constitute it a compound of two equivalents of protoxide, and one of peroxide or plumbic acid ($2PbO+PbO_2$) that is, 223.2 parts of the former oxide, and 119.6 of the latter.—*C.*

Properties and Uses.—The only purpose for which this article is used, is in the formation of plasters, as for instance, the *Black Plaster*, or *Black Salve*, a beautiful and efficacious agent in cuts, wounds, ulcers, some cutaneous affections, etc.

Off. Prep.—Emplastrum Plumbi Compositum; Unguentum Plumbi Compositum.

PODOPHYLLUM PELTATUM.

Mandrake.

Nat. Ord.—Berberidaceæ, *Brown;* Podophylleæ, *Lindley.* *Sex. Syst.*—Polyandria Monogynia.

THE RHIZOMA, OR ROOT.

Description.—This plant is also known by the several names of *May-apple*, *Wild-lemon*, *Raccoon-berry*, *Wild Mandrake*, etc. It is an indigenous, perennial herb, with a long, jointed, dark-brown rhizoma or root, about half the size of the finger, spreading extensively in rich grounds in which it is introduced, and giving off fibers at the joints; internally it is yellowish. The *stem* is simple, round, smooth, erect, dividing at top into two round petioles from three to six inches long, each petiole supports a leaf; it is about a foot high, and invested at its base by the sheaths which covered it when in bud. The *leaves* are large, peltate-palmate, oftener cordate, in from five to nine wedge-shaped lobes, each lobe six inches long from the insertion of the petiole, two-lobed and dentate at the apex; they are smooth, and yellowish-green on the upper surface, paler and slightly pubescent beneath. In barren stems which support but one leaf, the peltate character is the most perfect. The *flower* is solitary in the fork of the stem, on a round nodding peduncle one or two inches long, white, large, about two inches in diameter, and somewhat fragrant. The *calyx* consists of three oval, obtuse, concave, caducous *sepals*, which cohere in the bud by their scarious margins. The *corolla* is composed of from six to nine white, obovate, obtuse, smooth, concave *petals*, curiously netted with slight, transparent veins. *Stamens* from nine to twenty, shorter than the petals, curving upward, with yellow, oblong *anthers* twice as long as the filaments, and not opening by perfect uplifted valves. *Ovary* oval, compressed, obscurely angular. *Stigma* subsessile, convex, its surface rendered irregular by numerous folds and convolutions. The *fruit* is fleshy, ovoid-oblong, one-celled, one or two inches in length, of a lemon color, with brownish spots when ripe, and crowned with the large, persistent stigma; the flavor of the mucilaginous pulp is somewhat similar to that of a strawberry, and incloses twelve seeds in pulpy arils.—*L.*—*W.*—*G.*

History.—Mandrake is found throughout the United States in low, shady situations, rich woods and fields, flowering in May and June, and maturing its fruit in September and October. It is quite common in the Middle and Western States, rare in New England. The fruit has a somewhat acid taste, and is much liked by some persons, while it is very disagreeable to others; it possesses slightly laxative and diuretic properties. The properties of the leaves are not satisfactorily determined, though deemed poisonous. The root was well known to the Indians as an active cathartic; the proper time for collecting it is in the latter part of October, or early part of November, soon after the ripening of the fruit. As found in the shops, the dried root is generally broken from one to four or more inches in length, varying in thickness from one to four lines, deep-brown or blackish externally, dingy white internally, corrugated longitudinally, knotty and swollen at intervals, and beset with the remains of the radicals. It is faintly odorous, with a saccharine, bitter taste, succeeded by some acridity. It is readily reduced to a grayish powder, having somewhat the odor of ipecacuanha. It breaks with a short fracture. Its active principles are readily taken up by alcohol, or ether; water takes up only a portion of its activity. Mr. John R. Lewis found the root to contain a resin soluble in alcohol or ether, a resin soluble in alcohol, but not in ether, gum, starch, albumen, extractive matter, gallic acid, fixed oil, potassa and lime salts, lignin, traces of essential oil, etc.—*Am. Jour. Pharm.*, *XIX.*, 165. Both resins are purgative, and probably compose our medicinal *podophyllin.*

Properties and Uses.—If the fresh plant or root be taken, it will act as an irritant and poison, causing hypercatharsis, hyperemesis, gripings, and other unpleasant symptoms; the recently dried root is a drastic cathartic and emetic in doses of from thirty to sixty grains; but the violence of its action is materially modified by age, or roasting. Mandrake is cathartic, emetic, alterative, anthelmintic, hydragogue, and sialagogue. It is an active and certain cathartic, being equal, if not superior to jalap, though operating more slowly. When given in combination with bitartrate of potassa, it causes watery stools, on which account it has been found serviceable in dropsical affections. As a deobstruent, it is one of the most valuable in our Materia Medica, acting through and upon all the tissues of the system—and its action continues for a long time. Small doses, repeated at short intervals, to fall short of catharsis, will induce pytalism with many persons. In bilious and typhoid febrile diseases, it is very valuable as a cathartic, or emeto-cathartic, often breaking up the disease at once. Its cathartic operation is apt to be slow, sometimes remaining twenty-four hours, and producing considerable distress, which is, however, more than compensated for, by the thorough and cleansing manner in which it acts. In chronic hepatitis, there is not its superior in the whole range of medicines, being vastly more useful than mercurial agents, arousing the liver to a healthy action, increasing the flow of bile, and keeping up these actions longer than any other agent with which we are acquainted. In alterative doses, it has been found exceedingly valuable in scrofula, syphilitic diseases, rheumatism, and many other forms of chronic disease. In constipation, it acts upon the bowels, without disposing them to subsequent costiveness. It has likewise been found very beneficial in dysmenorrhea, amenorrhea, incontinence of urine, worms, and some affections of the bladder. Dose of the powdered root, as a cathartic, from ten to thirty grains; of the tincture from ten to sixty drops; as a sialagogue and alterative, from three to ten grains of the powder, or from five to twenty drops of the tincture. Since the preparation of the *podophyllin* by Mr. W. S. Merrell, the crude drug is seldom employed. The *Podophyllum Montanum* of Rafinesque, having a slender, deeply furrowed stem, the leaves with sharp, bifid segments, palmate, not peltate, with narrow sinuses, and many unequal teeth; the petals six to seven, oblong, obtuse; stamens seven to nine, and berry yellowish, oblong, is possessed of similar medical properties.

Off. Prep.—Decoctum Podophylli; Emplastrum Picis Compositum; Pilulæ Aloes Compositæ; Tinctura Podophylli.

PODOPHYLLIN.

The Resinoid or Active Principle of Mandrake.

Preparation.—This is, undoubtedly, as with the major part of our concentrated preparations, an impure resin. It may be prepared by adding a saturated tincture of the root to an equal quantity of water, and distilling off the alcohol; the resin falls to the bottom. The water contains the gum, mucilage, extractive, etc. It may likewise be precipitated without heat by adding a solution of alum to a saturated tincture of the root, but by this process all the resin is not obtained.

I am indebted to the Messrs. F. D. Hill & Co., of this city, for the following process of manufacturing Podophyllin, as pursued by them; these gentlemen, in common with all liberal physicians are desirous of elevating our school of medicine by all honorable means, and one among these means is opposition to all secret remedies or preparations; and for the prompt and cheerful manner in which they have furnished any information requested of them, they deserve the thanks of the profession. "Exhaust coarsely powdered Mandrake-root with alcohol, by percolation. Place the saturated tincture in a still, and distill off the alcohol, the residue will be a dark fluid of the consistence of molasses; sometimes it is thicker, and when this is the case add a small portion of it to some water, and if it does not form a yellow-whitish precipitate, a small quantity of alcohol must be added to it, or enough to cause the light precipitate. Then warm the thick residual fluid, and slowly pour it into three times its volume of cold water, which must be constantly agitated during the process. If poured in too fast, or without agitation, the fluid will fall to the bottom unchanged. Allow it to stand for twenty-four hours; at which time nearly all the Podophyllin will be precipitated, the addition of a sufficient quantity of muriatic acid will precipitate the remainder. The precipitated Podophyllin of a whitish-yellow color, is now to be removed and placed on a linen filter, and washed several times with water, to remove any remaining acid, gum, etc.; after which it is to be placed in thin layers on paper, and dried in a room of a temperature between 65° and 90° F., or if in summer at the natural atmospheric temperature—it becomes a shade or two darker by drying in this manner, but if artificial heat be employed to hasten the process, or of a higher temperature, the resin becomes quite dark."

This valuable agent I had the honor of introducing to the profession several years since. In 1835 I was first led to an examination of the resinous principle of this plant, as well as of the Iris, Cimicifuga, Aletris, and several other plants, in consequence of some information given to me by Professor Tully, of Yale College, New Haven, Conn., relative to the resinous constituent of the Cimicifuga Racemosa. And since August, 1835, I have prepared and used, more or less in my practice, in the treatment of various forms of disease, the resins of Podophyllum, Iris, Cimicifuga, Aletris, and several other medicinal plants. In July, 1844, I first called public attention to the resins of Podophyllum and Iris, in the New York Philosophical Medical Journal, vol. i., No. 7, pages 157–161, in which I recommended the Mandrake resin in combination with an alkali, for hepatic diseases, scrofula, dropsy, leucorrhea, syphilis, gonorrhea, gleet, obstructed menstruation, etc., but of which it appears but little notice was taken by the profession. In April, 1846, I again called the attention of the profession to this, as well as many other concentrated preparations, in the Western Medical Reformer, vol. v., No. 12, pages 175–178. Now, as dates are the only reliable source of correct information in such matters, unless some one can show an earlier notice of these articles, and of their practical utility, than the above, their claims will naturally be considered doubtful. The credit of first preparing Podophyllin, and other concentrated preparations, for the use of the profession generally, it being part of his avocation, belongs to Mr. W. S. Merrell, druggist and chemist, of Cincinnati, who first manufactured it, in June, 1847; since which it has become an indispensable and highly important American remedy; and is used by all classes of physicians, being generally preferred to mercurials by those who have fairly tested it. (*See College Journal*, 1857, *p.* 557.)

Podophyllin varies in color according to its mode of precipitation, being when precipitated by heat, dark-brown; and when by acid, a light brownish-yellow, or greenish-olive if by alum. It is insoluble in water, oil of turpentine, dilute nitric acid, and dilute alkalies. It appears to be composed of two resins, both of which are purgative, one is soluble in alcohol only, the other in alcohol or ether. From the presence of gum, or perhaps from an oxidation of the resin (an example of which may be witnessed in the pine-gum), soon after its preparation, a portion of Podophyllin ceases to be dissolved by alcohol. It has no alkaline nor acid reaction, but forms a saponaceous compound with the alkalies.

Properties and Uses.—It possesses the properties of the root in a superior degree; from four to eight grains operate as an active emeto-cathartic, with griping, nausea, prostration, and watery stools; from two to four grains, as a drastic cathartic, with nausea and griping; from one half a grain to two grains generally operates as an active cathartic, leaving the bowels in a soluble condition; in very small doses, it is gently aperient and alterative. We make use of this agent in those cases where mercurials are used by a certain class of practitioners, and find the result to be vastly in our favor; it fulfills all the indications for which mercurials are recommended and used. The action of Podophyllin is very much increased by long trituration, with four or five times its weight of loaf-sugar or sugar of milk (*lactin*). In doses of half a grain, or a grain, it is one of our most valuable cholagogue cathartics, operating mildly yet effectually, arousing the whole biliary and digestive apparatus to a normal action, and which is very persistent in its character. It likewise exerts a favorable influence on the cutaneous functions, producing and maintaining a constant moisture on the skin. In doses of from one-eighth to one-half of a grain, or rather in sufficient doses not to purge, it acts as a powerful alterative, and will induce ptyalism in some persons, and is very useful in scrofulous and syphilitic diseases, hepatic affections, dysmenorrhea, rheumatism, gonorrhea, and recent disease of the prostate. It produces a powerful and lasting impression upon the glandular system and secretory organs, unequaled by any other article. It has likewise been found to act as an emmenagogue, and may also be safely and beneficially administered in jaundice, dropsies, dysentery, diarrhea, bilious remittent and intermittent fevers, puerperal fever, typhoid fever, phrenitis, and all glandular enlargements; and in congestive fever it will produce evacuations from the bowels, when mercurials and all other agents fail. There is not a better cholagogue preparation known in medicine than the combination of Podophyllin and leptandrin. It is superior to mercurials or any other preparation of the kind, has an extensive range of application, combines certainty and permanency of action, and is less liable to effect harm, even in the hands of ignorant or injudicious practitioners, than any other known remedy of equal power and energy. In urethral stricture and recent disease of the prostate, the following pill has cured several cases:—Take, of Podophyllin and iridin, of each, four grains, alcoholic extract of belladonna, five grains, strychnia, a grain or a grain and a half, conserve of roses, a sufficient quantity to make a pill mass. Divide into twenty pills, of which, one may be given for a dose, and repeated three times a day, using in combination with it active diuretic infusions. Podophyllin should never be given, except in very fine powder, or which is still better, thoroughly triturated with loaf-sugar, sugar of milk, ginger, or some soluble extract. Five grains well triturated with sugar of milk, will make ten or fifteen active cathartic doses. When used alone, it is very apt to produce irritation and pain of the stomach, but castile soap, alkalies, or ginger added to it deprives it of most of its irritating and nauseating tendency and disposition to gripe. Caulophyllin combined with it, materially lessens its painful and disagreeable effects. Care should always be taken to proportion the dose of Podophyllin to the susceptibilities and condition of the patient, as in some cases half a grain will prove a vigorous emeto-cathartic, while in others it would require twice that amount. When it operates too actively, the administration of alkaline solutions with aromatics internally, and in severe cases by enema, will check it.

It is much to be regretted that persons can be found so lost to all honor and moral principle as to endeavor to force upon the profession worthless and unreliable concentrated agents, even after these agents have been publicly exposed, for the mere purpose of pecuniary gain; yet, unfortunately such is the fact; but it is still more to be regretted that persons, actuated by motives of interest and ambition, looking only to their own personal aggrandizement, who are ignorant of the first principles of science, and, therefore, incompetent as judges, and who do not hesitate to deceive and misrepresent, should receive the confidence and fellowship of honorable men.

A liberal physician says of Podophyllin: "As a cholagogue cathartic, it probably has no equal in the Materia Medica. Its operation is *slow*, *mild* and *certain*. It produces a specific action on the liver, arousing it to action, and producing free 'bilious evacuations,' rather of a hydragogue character, but is not liable to produce intestinal irritation, unless given in unnecessarily large doses. It usually takes from six to eight hours for it to operate as a cathartic, unless combined with cream of tartar or some other article by which its action will be hastened. As a cathartic in all biliary derangements not attended by intestinal irritation, it is a superior remedy. In bilious fevers, either remittent or intermittent, as well as in acute hepatitis or bilious-pneumonia, it not unfrequently arrests the disease at the first prescription if given in a proper manner, or it so far modifies the attack that the case becomes mild and manageable. In chronic hepatic derangements, with dyspepsia, it is a most valuable remedy. Its range of application is perhaps more extensive than any other cathartic medicine, except what is claimed by the old school for mercury. The Podophyllin *is* a regulator of all the secretions as far as any one remedy can be. It is indicated in *all cases* where, according to 'the books,' mercury is indicated, and while in any and every case it will do all the good that mercury can be presumed to do, it is entirely free from any of the objections to that article. The dose varies from one-fourth to one-half a grain, repeated once in two or three hours. The best mode of using it is to triturate it thoroughly with ten times its weight of pure white sugar, or sugar of milk, and give from one to five grains of the trituration at a dose once in two or three hours, until the proper effect is produced. It will usually operate in about six hours, sometimes in less. If it is desirable to have an operation sooner, add twenty or thirty grains of cream of tartar and one-fourth of a grain of capsicum to each dose. This is not apt to nauseate when first given, but if the stomach be much deranged or bilious, it will be pretty sure to vomit, though not excessively, about the time its cathartic effect commences. If given alone, however, it is quite sure to operate as an emeto-cathartic, unless the doses be very small, and the intervals between them longer than three hours. As an aperient or alterative, from one-sixth to one-fourth of a grain given evening and morning, or three times a day will generally be sufficient. It is better, however, in all cases to triturate it as before directed, and give the dose accordingly. A combination of one part Podophyllin and ten parts leptandrin triturated with ten parts of sugar, is an excellent alterative in dyspepsia, hepatitis, etc. As a remedy in puerperal fever, I consider the Podophyllin almost a specific. I prescribe it in one-fourth to one-half grain doses with half a drachm of cream of tartar, to be repeated every two hours until it produces free purging, and in no instance have I had any trouble with the case after its operation."

The late Prof. T. V. Morrow makes the following remarks: "Perhaps no medicine has been introduced to the notice of the medical profession, for the last one hundred years, which promises to be of so much value as the Podophyllin. An experience somewhat extensive in the use of this agent in the treatment of a great variety of cases of disease during the last six months, has fully convinced the writer of its immense value as a remedial agent—more especially as a purgative and alterative. To prepare it properly for use, it should be finely pulverized, and given in doses of from one and a half to three grains, to an adult, mixed in a little simple syrup or sweetened water—say in one-half a tablespoonful or about two teaspoonfuls. In doses of this size it will operate with great efficiency and certainty as a purgative, in from four to eight hours, producing several pretty copious and moderately consistent discharges, which are very frequently charged to a considerable extent with bile. In some instances a longer period will elapse before its operation will commence, and in nearly every case it leaves the bowels in a gently lax condition, perhaps for two or three days after its operation is over. It operates with much energy and efficiency, without harshness, seldom producing griping; but it occasionally produces nausea, and, in full doses, may cause vomiting, but in small doses, seldom produces these effects. Some practitioners, who have used the Podophyllin, say it will operate quite satisfactorily as a purgative, in doses of one grain. This is one of the cathartics which, during its operation, seems to exercise a powerfully-controlling influence over the condition of the cutaneous tissue, as well as the action of the heart and arteries, producing, in many instances, a moderately copious perspiration, which often continues, to a greater or less extent, during the whole period of its operation. This is more especially true when it causes nausea and vomiting. But when these effects do take place, the patients never experience that death-like and powerful depressing sickness, which not unfrequently results from the operation of the powdered root of the Podophyllum Peltatum, when given in full doses. I have found the Podophyllin quite a popular and convenient purgative, the dose being so remarkably small that no one objects to taking it on account of its unpleasant and inconvenient size.

"In the treatment of the various kinds of intermittent, remittent, and continued forms of fever, I have had frequent opportunities to test its value, during the past summer and fall. With one single dose, of from two to three grains, of this medicine, I have frequently arrested the progress of a severe attack of bilious remittent fever, requiring nothing further to complete the cure, except some gentle tonic and restorative medicine, and a proper avoidance of the exciting causes. The same remarks apply with equal truth to the intermitting forms of fever, as well as to some of the continued. In every variety of case, which is characterized by much hepatic torpor and congestion of the portal circle, it has manifested a superior controlling power, appearing to arouse the torpid energies of the liver, and restoring very promptly its lost functions.

"But in no class of cases has this medicine manifested a higher degree of value, so far as I have been able to observe its effects, than in those cases marked by strong determination of blood to the brain, producing either congestion or incipient inflammation of that organ. In several cases of this description, in the treatment of which I have witnessed its effects, I was agreeably surprised to find every trace of congestion eradicated by one or two thorough operations of this article. It seemed to exercise a more completely controlling influence over this pathological condition than any medicine I have ever known used for the same purpose. Of course, in these cases it was used in moderately full doses, and its operations continued for a considerable length of time. In cases of puerperal fever, in their incipient stage, it has manifested itself as a medicine of superior value, arresting them at once, when administered in full doses, and even as a common purgative dose after confinement, no medicine has exercised a happier influence. I have availed myself of its use under these circumstances, in numerous instances, with the most beneficial and satisfactory results. In a case of dropsy of the serous cavities, as well as cellular texture of the whole body, the Podophyllin was administered in doses of one-half a grain, in conjunction with half a teaspoonful of cremor tartar, every two hours, until it produced a half-dozen or more copious watery discharges from the bowels, and repeated in two or three days afterward, till the same effects took place, it soon relieved the patient completely of the dropsical effusion!! From its effects in this case I should be led to entertain a favorable opinion of its powers in all cases of dropsy.

"I have used the Podophyllin in numerous cases of cholera infantum, and other attacks of summer-complaint in children, with very satisfactory results. In these cases, however, it was given in very small doses. To a child three years old, it was given in doses of from one-fourth to a half of a grain, once in six or eight hours for thirty-six to forty-eight hours, and it scarcely ever failed to afford decided advantage, more especially in those cases in which there was frequent hepatic torpor, in connection with a determination of blood to the head. The results of my experience in the use of this article as a remedial agent, on the whole, are such as to leave no doubt on my mind that it is destined soon to occupy a conspicuous place among the most valuable remedies of the Materia Medica, with a very extended range of application in the treatment of disease. As an alterative, it has demonstrated its value beyond all doubt, in numerous cases in which it has been used during the past summer and fall, especially in that class of cases in the treatment of which the routine practitioners of the orthodox school regard the mercurial preparations as of indispensable importance. Indeed, it promises to be more than a substitute for the mercurials, in all those cases in which these medicines have proved of any substantial value, without their liability to produce injurious effects on the constitution of patients."

Off. Prep.—Pilulæ Baptisiæ Compositæ; Pilulæ Copaibæ Compositæ; Pilulæ Ferri Compositæ; Pilulæ Leptandrini Compositæ; Pilulæ Podophyllini Compositæ; Pulvis Leptandrini Compositus; Pulvis Podophyllini Compositus.

POLEMONIUM REPTANS.

American Greek-Valerian.

Nat. Ord.—Polemoniaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—This is an indigenous perennial plant, sometimes known as *Blue Bells*, *Jacob's Ladder*, etc. It has a creeping *root*, and a smooth, erect, weak, fleshy, diffusely-branched *stem* from twelve to twenty inches high. The *leaves* are alternate, and pinnately divided; the leaflets from seven to eleven, ovate-lanceolate, acute, subopposite, smooth, entire, sessile, an inch long and half as wide; the upper leaflets are sometimes confluent. The *flowers* are numerous, terminal, rather large, nodding, on short petioles, blue, and nearly bractless. The *calyx* is campanulate, five-cleft; the segments lanceolate-acute, persistent, much shorter than the tube of the corolla. The *corolla* is rotate-campanulate, limb five-lobed, erect, tube short, closed at the base by five stameniferous valves. *Stamens* five, equally inserted at the summit of the corolla-tube; *filaments* slender, declined, hairy-appendaged at the base; *anthers* introrse. *Capsules* three-celled, three-valved; *cells* two to three-seeded.—*W.*—*G.*

History.—This is a handsome plant, growing in woods, damp grounds, and along shady river banks, from New York to Wisconsin, bearing blue flowers in May. The root is the part used, and yields its virtues to water; it has not been analyzed. The *Polemonium Cœruleum*, or Greek-Valerian, is a native of England. It is larger and more numerously-flowered than the above, and is often found cultivated in gardens. The *stems* are about two feet high, stout, hollow, several from the same root, each dividing at top into a corymbose panicle. The *leaves* are mostly radical, on long, grooved petioles, pinnately eleven to seventeen foliate; *segments* sessile, ovate-lanceolate, subopposite, acuminate, oblique, odd one lanceolate. *Flowers* blue, terminal, suberect. This plant, probably, possesses medicinal virtues similar to the one above.—*W.*

Properties and Uses.—Alterative, diaphoretic, and astringent. A warm infusion of the root will, it is said, produce copious perspiration, and has been found serviceable in pleurisy, febrile and inflammatory diseases. The tincture, made of whisky, in doses of from one to two fluidounces, two or three times a day, has been found valuable in all scrofulous diseases, and other chronic diseases where an alterative is indicated. The infusion is recommended in bites of venomous snakes and insects, and in bowel complaints requiring the use of astringents. Reported to have cured consumption.

Off. Prep.—Infusum Polemonii.

POLYGALA NUTTALLII.

Ground Centaury.

Nat. Ord.—Polygalaceæ. *Sex. Syst.*—Diadelphia Octandria.

THE WHOLE PLANT.

Description.—This plant also called *Nuttall's Polygala*, the *Polygala Nuttallii* of Torrey and Gray, and the *Polygala Fastigiata* or *P. Sanguinea* of Nuttall is an annual plant, with erect, often branched-fastigiate *stems* from six to twelve inches in height; sometimes fifteen or more stems will grow from one root, and on the root will be observed something resembling a nearly developed flower. The *leaves* are linear, scattered, acutish, about half an inch long, and one or two lines broad. The *flowers* are rose-purple, deciduous, and disposed in rather loose, ovoid-globose spikes, from half an inch to nearly an inch long, and from four to six lines in diameter. *Wings of the calyx* oblong, tapering to a claw twice longer than the fruit. *Crest of the corolla* minute. *Seeds* black, with an investing caruncle.—*W.*—*N.*—*T.*—*G.*

History.—This plant grows in pine barrens, and dry sandy soils from Massachusetts to New Jersey, and southward near the coast, flowering from July to October.—*G.* The whole plant is used; it yields its virtues to water or alcohol. The *P. Nuttallii*, and the *P. Fastigiata* are described by botanists as different species, but they closely resemble each other, and possess the same properties.

Properties and Uses.—Tonic, alterative, diuretic, and anti-furuncular. It is much used as a domestic medicine on Long Island, N. Y., where it has the reputation of being almost infallible as a remedy in fever and ague. Two or three drachms of the plant made into a strong decoction will act as a purgative. It is much used, also, as an alterative in boils, cutaneous eruptions, and *especially in erysipelas.* A gentleman who had a large boil under his arm, which was on the verge of suppuration, and several smaller ones on his arms and body, macerated about two drachms of the plant in half a pint of whisky, of which he took a tablespoonful three times a day. On the second day after commencing its use, he discharged nearly four times the usual amount of urine, which weakened him considerably; his appetite improved very much, and the boils disappeared without suppurating. I have found this plant decidedly efficacious in erysipelas and boils, and take pleasure in recommending it to the profession as a valuable remedial agent, whose powers are not yet fully understood.

POLYGALA RUBELLA.

Bitter Polygala.

Nat. Ord.—Polygalaceæ. *Sex. Syst.*—Diadelphia Octandria.

THE ROOT AND HERB.

Description.—This is the *Polygala Polygama* of Walter. It is an indigenous herb, with a perennial, branched, and somewhat fusiform root. The *stems* are simple, crowded, many from the same root, angular, smooth, and erect, growing from six to twelve feet high. The *leaves* are linear, oblong, mucronate, smooth, alternate below; linear-lanceolate, obtuse, sessile above. The *flowers* are crested, purple, and in terminal or lateral racemes; the former are spike-form, loose, with the flowers perfect and winged; the latter are leafless, prostrate or subterraneous, wingless, and nearly apetalous. *Wing of the calyx* broadly obovate, and longer than the crested corolla. *Anthers* eight, in two equal parcels. *Bracts* small, subulate, caducous. *Lobes of the caruncle* two, scale-like, shorter than the seed.—*L.*—*G.*—*W.*—*B.*

History.—This plant inhabits fields and pastures from Canada to Florida, being common in dry sandy or gravelly soils, and bearing handsome, rose-purple flowers in July. The whole plant is used. It is inodorous, with a persistent and powerfully bitter taste, which is imparted to water or alcohol. It has not been analyzed. The *Polygala Amara* and the *Polygala Paucifolia*, or Fringed Polygala, possess similar properties, and may be employed as substitutes; the root of the latter has a pleasant, spicy flavor, very similar to that of Gaultheria.

Properties and Uses.—In doses of from three to ten grains it is an excellent bitter tonic; from ten to thirty grains it acts upon the bowels, and causes slight diaphoresis. An infusion has been found beneficial as a tonic in debility of the digestive organs. It may be used in all cases where a bitter tonic is indicated.—*Bigelow.*

POLYGALA SENEGA.

Seneka.

Nat. Ord.—Polygalaceæ. *Sex. Syst.*—Diadelphia Octandria.

THE ROOT.

Description.—Seneka is an indigenous plant, with a perennial, firm, hard, branching root, consisting of a moderately solid wood, and a thick bark; it sends up several annual *stems*, which are erect, simple, smooth, from eight to fourteen inches high, occasionally tinged with red. The *leaves* are alternate, nearly or quite sessile, lanceolate, with a sharpish point, smooth, paler underneath, from one to three inches long, and about one-third as wide. The *flowers* are white, on short pedicels, in a close terminal spike, from one to three inches in length. The *calyx* consists of five sepals, the two largest or wings concave, roundish-ovate, white, slightly veined, and larger than the petals. The *corolla* consists of three petals, two lateral and obtuse, and a short-crested extremity, they are small and closed. The *capsules* are small, obcordate, invested by the persistent calyx, compressed, two-celled, two-valved. *Seeds* two, oblong-ovate, acute at one end, slightly hairy, curved, blackish, with a longitudinal, bifid, white strophiola on the concave side. The spike opens slowly, so that the lower flowers are in fruit while the upper ones are in blossom.—*L.*—*W.*

History.—Seneka, or *Seneca Snake-root*, as it is usually called, is found in various parts of the United States in rocky woods, and on hill-sides, flowering in July. It is found in the greatest abundance in the Southern and Western States, and is rare in the Eastern. The dried root, which is the officinal part, varies in size from two to four or five lines in diameter; it is crooked, presents a number of eminences, and terminates superiorly in an irregular tuberosity, which seems to be formed by the junction of several stems; a carinate line extends the whole length of the root. The cortical part is wrinkled, marked with transverse fissures, thick, and of a grayish-yellow color. The meditullium or central portion is woody, white, and possesses but little or no medicinal properties, which reside chiefly in the thick, resinous-like bark. The recent root has a disagreeable, sickening odor, which diminishes very much by drying; its taste somewhat saccharo-mucilaginous, succeeded by heat and pungency, irritating the mouth and fauces. It imparts its virtues to water or alcohol; alcohol, of sp. gr. 0.935, is its best solvent. The infusion is stronger than the decoction, and should be prepared by displacement, the water used having the temperature of about 104° F. Too high a temperature renders the acrid principle insoluble in water. Seneca Snake-root has been analyzed by Feneulle, Dulong, Folchi, and other chemists, with variable results; the latest and most elaborate analysis was made by M. Quevenne in 1836; he obtained an acrid matter which he named polygalic acid, virgineic acid, pectic acid, tannic acid, yellow bitter coloring matter, cerin, fixed oil, gum, albumen, woody fiber, salts, alumina, silica, magnesia and iron.—*P.*

Prof. W. Procter has given the following process for obtaining polygalic acid: Boil sixteen ounces of powdered Seneka in four pints of alcohol 35° B., for fifteen minutes; allow it to cool, then throw the whole on a displacement filter, with two ounces of animal charcoal purified, and when the liquid ceases to pass add more alcohol until six pints of tincture are obtained. Distill off the alcohol till of a syrupy consistence, wash this with sufficient ether until all fatty matter is removed, and throw the residue into several times its bulk of concentrated alcohol. After standing for twenty-four hours, the polygalic acid will be precipitated as a light brown powder, which is collected on a filter, washed with cold, strong alcohol, and dried.

Prof. E. S. Wayne has prepared it by the following method: Evaporate a saturated tincture of the root, adding water from time to time as the alcohol escapes, filter to separate the resin, and to the filtered liquid add subacetate of lead; wash the precipitated polygalate of lead by sulphohydric acid, which forms an insoluble sulphide of lead, leaving the polygalic acid in solution. Heat the solution to expel the excess of sulphohydric acid (and if colored, add animal charcoal), then filter, evaporate on a water-bath to the consistence of syrup, throw this in alcohol, and on standing the polygalic acid will precipitate.

Polygalic acid or Polygalin, or Senegin, is a white, odorless powder, tasteless at first, but soon communicating an acrid, pungent feeling to the mouth, and produces a painful constriction in the fauces. The powder excites violent sneezing. It is easily soluble in boiling water or alcohol, but insoluble in ether and oils; gives no definite compounds with bases, and contains no azote. It is not altered by exposure to the air. Its solution has an acid reaction. Its formula is $C_{22}\ H_{18}\ O_{11}$, while that of *Saponin*, with which it is closely analogous, is $C_{26}\ H_{24}\ O_{16}$. Chemists are not agreed as to its true character.

The *Polygala Sanguinea*, or Caducous Polygala, and the *Polygala Chamæbuxus*, possess similar properties with the Seneka, and may be used as a substitute.

Properties and Uses.—In large doses, Seneka is emetic and cathartic; in ordinary doses it stimulates most of the secretions, acting especially as a sialagogue, expectorant, diuretic, diaphoretic, and emmenagogue. Its expectorant properties render it very useful in chronic catarrh, and protracted pneumonia, also in humoral asthma, and in the commencing stages of croup. In active inflammation its use is contra-indicated. In relaxed sore-throat it is recommended as a local stimulant; also as a diaphoretico-diuretic in rheumatism, and as an emmenagogue in amenorrhea. Dose of the powdered root, from five to twenty grains; of the infusion or syrup, from half a fluidounce to two fluidounces. The extract prepared from an infusion of the root, obtained by percolation, and evaporated to the proper consistence by means of a water-bath, may be given in doses of from one to four grains. Polygalic acid may be given for the same purposes as the root, in doses of from one-fourth to one-half of a grain; it is best taken in hot sweetened water.

Off. Prep.—Infusum Senegæ; Tinctura Laricis Composita.

POLYGONUM PUNCTATUM.

Water-pepper.

Nat. Ord.—Polgonaceæ. *Sex. Syst.*—Octandria Trigynia.

THE WHOLE HERB.

Description.—This plant, sometimes called *Smart-weed*, is the *Polygonum Hydropiper* of Michaux. It is an annual plant, with a smooth *stem*, branched, often decumbent at base, slender, jointed, swelling above the joints, of a reddish or greenish-brown color, sprinkled with glandular dots, and from one to two feet in height. The *root* is white, whorled, and fibrous. The *leaves* are alternate, lanceolate, petiolate, punctate with pellucid dots, wavy and scabrous on the margin, two or three inches long, and not more than one-fifth as wide ; the *petioles* are sheathing, inflated, fringed. The *flowers* are small, greenish-white or purple, and are disposed in slender, loose, interrupted, drooping, but finally erect spikes or racemes; bracts remotely alternate. The *calyx* is four or five cleft, and covered with glandular dots. *Stamens* six to eight; *styles* two to three, united at the base and half way up. *Fruit* either lenticular or three-sided, opaque, roughish. *Seed* one.—*W.*—*G.*

History.—Polygonum Punctatum, is a well known, intensely acrid plant, found growing in nearly all parts of the United States in ditches, low grounds, among rubbish, and about brooks and water-courses, flowering in August and September. There are many species of Polygonum, but which, although possessing similar virtues, yet differ materially in their medical potency. The whole plant is officinal, and has a biting, pungent, acrid taste, and imparts its virtues to alcohol or water. Age renders it inert, and heat impairs its medical qualities. It should be collected and made into a tincture while fresh. The plant has not been analyzed.

The *Polygonum Persicaria*, called *Ladies' Thumb*, or *Spotted Knot-weed*, possesses similar but inferior medicinal properties, and may be distinguished from the above by the deeper green or purplish color of the whole plant, a brownish, heart-shaped spot near the center of the leaf, and its rose-colored flowers, in short, dense, terminal spikes. It has a feebly astringent saline taste, and at one time was considered antiseptic.

Properties and Uses.—Water-pepper is stimulant, diuretic, emmenagogue, antiseptic, diaphoretic and vesicant. Dr. Eberle, found it very efficacious in amenorrhea, in the dose of a teaspoonful of the saturated tincture, repeated four or five times a day, or from two to five grains of the aqueous extract; probably, an alcoholic extract would be found more active. He states that the use of it caused an increase of the heat of the body with a kind of formication, with bearing down and sense of fulness in the pelvic region. The infusion in cold water has been found serviceable in gravel, colds and coughs, and in milk-sickness, and mixed with wheat-bran in bowel complaints. In Asiatic cholera, the patients wrapped in a sheet moistened with a hot decoction, are said to have been much benefited, and recovered. In combination with sulphate of iron and gum myrrh, it is said to have cured epilepsy—probably dependent on some uterine derangement. Externally, used as fomentation, in gangrene, simmered in water and vinegar; the infusion or a fomentation of the leaves has been beneficially applied in chronic ulcers, and hemorrhoidal tumors, also as a wash in chronic erysipelatous inflammations, as a fomentation in tympanitis and flatulent colic. The fresh leaves bruised with the leaves of mayweed, and moistened with oil of turpentine, and applied to the skin, will speedily vesicate. The ashes of the plant combined with the ashes of the garden thyme, *Thymus Vulgaris*, are, it is said, used by many empirics as a solvent for gravel and stone, injected, in solution, into the bladder: hazardous and doubtful treatment. The infusion in cold water, forms an excellent local application in the sore-mouth of nursing women, and in mercurial ptyalism. The decoction, or infusion in hot water, is not so active as when prepared in cold or warm water. Dose of the infusion, from two to four fluidounces; of the saturated tincture, from one to four fluidrachms three or four times a day.

The POLYGONUM ARIFOLIUM, *Sickle-Grass*, *Halbert-leaved Tear-thumb* or *Hastate Knot Grass* has a grooved, angled, prostrate, aculeate *stem*, with reversed prickles, and growing from two to four feet in length. The *leaves* are halbert-shaped, taper-pointed, long-petioled, from two to four inches long, and about one-half as wide; the *petioles* are from half an inch to an inch long. The *flowers* are few, distinct, reddish-white, and are disposed in loose, slender, terminal, racemose clusters; *peduncles* glandular-bristly; *calyx* often four-parted, closed; *stamens* six; *styles* two, very short; *fruit* lenticular, large. It grows in low and wet grounds throughout the United States, flowering from June to September.— *W.—G.* An infusion of this plant in cold water is a powerful diuretic, useful in gravel, strangury, gonorrhea, and all urinary affections; it must be drank freely.

POLYGONUM FAGOPYRUM, or common buckwheat, may be used as follows to recall the flow of milk in the breasts of nurses, where it has disappeared for several days: Stir in any amount of buckwheat flour, a sufficient quantity of buttermilk to form a poultice; warm it, but be careful not to boil or make it hot. Apply it thus warm, over the whole breast and renew it every four or six hours. Sometimes it requires to be thus used for three or four days before its effects will be produced; usually, however, twenty-four hours will be sufficient.

POLYGONUM ERECTUM.—Erect Knot-grass, is a variety of Polygonum Aviculāre; it has an upright, branched, smooth *stem*, growing from one to three feet high. The *leaves* are smooth, broadly-ovate, rather obtuse, one or two inches long, about half as wide, and either sessile or petiolate, the petioles rarely being over three lines in length. The *flowers* are yellowish, small, two or three together, pedicellate in the axils of the leaves, and appear from June to October. *Stamens* mostly five. This is a perennial herb common to the Western and Middle States, and British America; it is found in abundance about country door-yards, road-sides, waste places, damp soils, etc.— *W.—G.* This plant in infusion has been found highly efficacious in the treatment of diarrhea, and especially in the summer-complaint of children.

Off. Prep.—Infusum Polygoni; Extractum Polygoni; Extractum Polygoni Fluidum; Pilulæ Polygoni Compositæ; Tinctura Caulophylli Composita; Tinctura Polygoni.

POLYPODIUM VULGARE.

Common Polypody.

Nat. Ord.—Filices, *Jussieu;* Filicales, *Lindley;* Polypodiaceæ, *Brown.* *Sex. Syst.*—Cryptogamia Filices.

THE ROOT AND TOPS.

Description.—This plant is also known by the names of *Rock-Polypod*, *Fern-root*, *Rock-Brake*, *Brake-root*, *Female-Fern*, etc. It has a perennial, creeping, irregular, brown *root*, with membranous scales extending to the caudex or base of the stipe. The *fronds* are from six to twelve inches high, disticbed, green, smooth, deeply pinnatifid, being divided into alternate *segments* nearly to the midvein, which are linear-oblong, obtuse, crenulate, the upper ones gradually smaller, parallel, a little curved, and about a quarter of an inch wide. *Stipe* naked and smooth. The *fruit* on the lower surface of the frond, in large, distinct, golden dots, sori, or capsules, without any indusium, round, in a double row, and becoming finally brownish.— *W.*—*Eaton.*

History.—Polypody is common on shady rocks, in woods, and mountains, throughout the United States. The root and tops are used in medicine; the root is of some length, two to four lines in diameter, frequently crooked, with chaffy scales, which are readily removed, and having many delicate, knobby rootlets; it has a peculiar, rather unpleasant odor, and a saccharo-mucilaginous, somewhat sickening taste. Water extracts its properties.

Properties and Uses.—This plant is pectoral, demulcent, purgative, and anthelmintic. A decoction or syrup has been found very valuable in pulmonary and hepatic diseases; and a strong decoction is recommended as a purgative, and for the expulsion of tenia, and other worms. Dose of the powdered plant from one to four drachms; of the decoction or syrup, from one to four fluidounces, three or four times a day.

Off. Prep.—Decoctum Polypodii.

POLYTRICHUM JUNIPERUM.

Hair-cap Moss.

Nat. Ord.—Musci,—Polytrichaceæ. *Sex. Syst.*—Cryptogamia Musci.

THE WHOLE PLANT.

Description.—This plant, sometimes known as *Bear's Bed*, *Ground Moss*, *Robin's-Rye*, etc., is indigenous, and perennial, with a simple or divided *stem*, more generally simple, slender, of a reddish color, and from four to seven inches in height. The *leaves* are linear-lanceolate, awn-pointed, entire, flattish, appressed, somewhat spreading, the margins inflexed. The *capsule* is oblong four-sided, the angles acute; the *calyptra* is densely hairy and white; the *lid* or *operculum* short-beaked from a convex base; *apophysis* depressed, and discoidal. *Peristome* single, of sixty-four teeth, adherent by their summits to the membranous-dilated apex of the columella. *Inflorescence* diœcious; *sterile flowers* terminal, cup-shaped.—*W.—G.*

History.—This is an evergreen plant, found on high, dry places, along the margins of dry woods, and exposed places, mostly on a poor, sandy soil, and is of a darker green color than the mosses in general. The leaves are closely set on the stem about one-half its length, above which the stem is naked, terminating in a capsule, covered with a white, hairy hood or calyptre. The whole plant is officinal. It yields its properties to boiling water by infusion. It has not been analyzed, but is deserving the especial attention of medical men.

Properties and Uses.—This is a very valuable and important remedial agent, which has been in use for a number of years, and is, I believe, unknown to a number of practitioners. It is a powerful diuretic in strong infusion. In doses of two fluidounces of the infusion, every half-hour, it has been known to remove from a dropsical patient from twenty to forty pounds of water in the space of twenty-four hours. It possesses but very little smell or taste, and never produces any nausea or disagreeable sensation in the stomach. It may be used in connection with hydragogue cathartics, or even alone, in dropsies, with the most decided advantage; and is a very useful article in gravel, and all urinary obstructions. Professor Jones considers it worthy to be ranked among the first, if not at the head, of the class of diuretics. Notwithstanding the reputation of this plant as a diuretic, I have known it frequently to fail in producing the slightest increase of the urinary discharge.

Off. Prep.—Infusum Polytrichi.

POPULUS BALSAMIFERA.

Balsam Poplar.

Nat. Ord.—Salicaceæ. *Sex. Syst.*—Diœcia Octandria.

THE BUDS.

Description.—This tree, also called *Tacamahac*, or *Tacamahac Poplar*, attains the height of from fifty to seventy feet, with a trunk about eighteen inches in diameter. The *branches* are smooth, round, deep-brown; the *buds* acuminate, smooth, and covered in the spring with an abundance of fragrant, viscid, balsamic juice. The *leaves* are ovate, gradually tapering and pointed, smooth on both sides, with fine glandular serratures, deep-green above, whitish and reticulate-veined beneath, and on long petioles; sometimes two glands at the apex of the petiole. *Scales* dilated, slightly hairy.—*L.—W.*

History.—This tree is found in Canada, the northern parts of the United States, and in Siberia. In this country it is in blossom in April. The leaf-buds are the officinal part, and should be collected in the spring; they are covered with a fragrant resinous matter, which may be separated in boiling water, and upon which their virtues depend. They have an agreeable, incense-like odor, and an unpleasant, bitterish taste. The balsamic juice is collected in Canada in shells, and sent to Europe, under the name of *Tacamahaca.* Alcohol or spirits is the proper solvent. They have not been analyzed.

The buds of the POPULUS CANDICANS, or *Balm of Gilead*, possess similar virtues to the above. The tree is of less stature than the P. Balsamifera, the *leaves* are broader, and heart-shaped, with a distinct sinus at the base—the *petioles* are hairy and the *branches* terete.—*G.*

Properties and Uses.—Poplar buds are reputed stimulant, tonic, diuretic, and antiscorbutic. A tincture of them has been beneficially employed in affections of the chest, stomach, and kidneys, and in rheumatism and scurvy. With lard or oil they form a useful external application in bruises, swellings, wounds, some cutaneous diseases, rheumatic pains, etc. Added to ointments they prevent in a great measure, their liability to become rancid, but in this respect are not equal to paraffin, which will wholly prevent rancidity in cerates and ointments prepared with it, as discovered by Prof. E. S. Wayne. The bark is said to be tonic and cathartic, and to have proved of service in gout and rheumatism. Dose of a tincture of the buds, from one to four fluidrachms; which is excellent for colds, and pain in the breast. An extract of the bark made with diluted acid, in the dose of from five to fifteen grains three times a day, is a useful tonic in debility, intermittent fever, rheumatism, etc.

POPULUS TREMULOIDES.

American Poplar.

Nat. Ord.—Salicaceæ. *Sex. Syst.*—Diœcia Octandria.

THE BARK.

Description.—This tree, also known by the names of *White-Poplar*, and *Aspen*, attains the height of from twenty to fifty feet, with a diameter of from eight to twelve inches. It is covered with a smooth, greenish-white bark, except on the trunks of very old trees. The *leaves* are orbicular-cordate, abruptly acuminate, dentate-serrate, smooth on both sides, pubescent at the margins, dark-green, three-nerved, from two to two and a half inches long, and one and a fourth as wide, and are on long, slender, and laterally compressed petioles, which accounts for the continual agitation of the leaves by the slightest breeze. *Aments* plumed with silken hairs, about two inches long, pendulous, appearing in April, long before the leaves. *Scales* cut into three or four deep linear divisions, and fringed with long hairs.—*W.*—*G.*

History.—This tree is common in Lower Canada, and in the Northern and Middle States. The bark is the officinal part, and should be collected in the spring, just as the sap begins to rise. Its virtues are imparted to alcohol, water, or acetic acid. There are several varieties of this tree, all of which possess similar properties, as the *Populus Grandidentata*, *P. Candicans*, etc.

These trees owe their virtues to two alkaloids, *Populin* and *Salicin*. The process for obtaining Salicin is described under its appropriate head. *Populin* exists in the bark in company with salicin, and is precipitated from a solution of the bark, after the salicin has been separated from it, by neutralizing the excess of sulphuric acid by a strong solution of carbonate of potassa. It may, however, be obtained from the leaves in greater abundance, by the following process: To a strong decoction of the leaves, add diacetate of lead, which occasions a fine yellow precipitate. Filter the liquid, and evaporate it to the consistence of syrup. When it cools the populin separates under the form of a very bulky crystalline precipitate. Subject it to strong pressure between folds of linen cloth, then heat it with one hundred and sixty times it weight of water, and a portion of animal charcoal, and filter the liquid while boiling hot. On cooling populin is deposited in fine silky needles. It is a very light substance, of a snow-white color, with a taste not unlike that of liquorice. It requires about two thousand times its weight of cold water to dissolve it, and about seventy times its weight of boiling. Alcohol when boiling, dissolves it, depositing the populin on cooling in the form of a crystalline magma. It is soluble in acetic, nitric, and phosphoric acids, from which it is precipitated by the alkalies. Strong phosphoric, and hot diluted mineral acids, convert it into a resin. Concentrated sulphuric acid gives a purple red solution with it. When heated, it first melts into a transparent and colorless liquid, and then burns with a strong flame, emitting an aromatic odor. Heated with potassa it is converted into oxalic acid.—*Thomson.* Diluted hydrochloric acid dissolves populin, and at 212° F. decomposes it, forming benzoic acid, grape sugar, and a resin which melts in boiling water, and has the characters of saliretin. Heated with a mixture of sulphuric acid and bichromate of potassa, it evolves hydruret of salicyle. Boiled with baryta water, or milk of lime, benzoic acid is precipitated by means of perchloride of iron; the excess of iron being then removed by lime, and the excess of lime by carbonic acid, salicin is obtained on evaporation of the filtered liquid. The conversion of populin into salicin may also be effected by heating it with an alcoholic solution of ammonia to 212° F.—*Am. Jour. Pharm.*, *XXVIII.*, 259.

Properties and Uses.—Poplar bark is tonic and febrifuge, and has been used in intermittent fever with advantage. An infusion of it is reputed a valuable remedy in emaciation and debility, lumbricoid worms, impaired digestion, chronic diarrhea, intermittent fevers, etc. As a diuretic, it has been beneficially used in urinary affections, gonorrhea, gleet, etc. The large aspen, *P. Grandidentata*, is said to be the most active and bitter. Dose of the powdered bark, one drachm, two or three times a day.

POTASSIUM.

Potassium.

Preparation.—A mixture of Carbonate of Potassa with finely divided charcoal is first prepared by igniting Cream of Tartar in a covered crucible, which leaves a mixture, well known as the Black Flux. This, while still warm, is mixed with a considerable proportion of charcoal in coarse powder and small fragments recently ignited, and allowed to cool in a covered crucible. The whole is now introduced into one of the hammered iron bottles used for holding mercury, coated outside with a mixture of sand and clay. The bottle is placed horizontally in a wind furnace, and a short wide tube of iron is fitted to it, to which tube is attached a copper receiver, partly filled with good naphtha, and having a diaphragm of copper, and on the further side of the receiver an aperture for the escape of gas, opposite the tube of the bottle; so that, if necessary, a strong steel rod may be introduced through this aperture, and another in the upper part of the diaphragm into the tube, for the purpose of cleaning it out, as it is apt to become choked. The receiver with the naphtha being surrounded with ice, a steady and uniform strong red or white heat (by means of dry wood, the flame of which plays all around the bottle), is applied to the bottle, and after a time Potassium, which is known by the appearance of its pink flame at the mouth of the tube, distills over, accompanied with carbonic oxide gas, and with a gray powder, which is the cause of the occasional choking of the tube. The Potassium drops into the naphtha, which protects it from the action of the air; to purify it entirely, it is re-distilled in a small iron retort along with a little naphtha into a receiver containing that liquid.—*Gregory.* See an improvement on this method, in *Am. Jour. Pharm., XXV., p.* 70.

History.—Sir Humphrey Davy discovered Potassium in 1807, by passing a powerful galvanic current through perfectly dry potassa. Soon after, Gay-Lussac and Thenard discovered that it could be obtained in greater quantities by passing potassa through iron-turnings, heated to whiteness in a gun-barrel covered on the outside with clay to protect it from the action of the fire. The common mode of preparing it is Brunner's, with Wöhler's modification, as given above.

Potassium is a solid, soft, bluish-white metal, having a high degree of metallic luster, but becoming instantly tarnished and oxydized when exposed to the air, from which it absorbs oxygen, and should therefore be kept in naphtha, a liquid which contains no oxygen. At the temperature of 50° it is a soft and malleable solid, like wax, at 136½° it becomes perfectly fluid, and at 32° it is hard and brittle, exhibiting a crystalline structure; it is lighter than water; its sp. gr. being 0.865, and is an excellent conductor of heat and electricity. Thrown upon the surface of water, it decomposes that liquid with rapidity, and the hydrogen gas evolved, carrying with it small particles of the metal, takes fire in the air, and communicating the combustion to the Potassium, the whole burns with a kind of explosion, emitting a red light. Heated in oxygen gas it burns with a brilliant white light. Its symbol is K, and its equivalent weight 39.15. Metals and metalloids whose attraction for oxygen is too strong to be overcome by the usual means, are isolated by Potassium. Thus, it decomposes the oxides or chlorides of aluminum, glucinum, yttrium, thorium, and zirconium, and the boracic and silicic acids. It is found chiefly in the ashes of land-plants, as oxide of potassa united to carbonic acid, and is also obtained as chloride in the ashes of sea-plants. Many rocks, minerals, and soils contain it; indeed, it is necessary to the growth of plants. Potassium forms two compounds with oxygen, a dry, grayish-white protoxide, $KO = 47.16$; and an orange-yellow peroxide, $KO_3 = 63.17$. Its protoxide unites with several acids, forming salts of potassa, some of which are used in medicine. Potassium itself combines with several agents, forming Potassium compounds. These medicinal agents will be described hereafter under their appropriate heads.

POTASSÆ BITARTRAS.

Bitartrate of Potassa.

History.—This salt, commonly called *Cream of Tartar*, in its pure state was unknown until the investigations of Scheele in 1769. It is obtained from the crude tartar, argol, or winestone of commerce, a grayish or brownish obscurely crystalline substance, which forms upon the inside of casks in which new wine has been kept. The tart wines deposit it in the largest quantity; it is composed of Bitartrate of Potassa, tartrate of lime, coloring matter, and other accidental impurities. Crude tartar is a constituent of many vegetable juices, especially of grape-juice, in which it exists, dissolved by the acid of the sugar present; and when that sugar is converted into alcohol, in which the tartar is insoluble, it becomes deposited upon the sides of the fermenting-casks. The red wines give a Red Tartar, and the white wines a White Tartar. Pereira states the following to be the mode of procuring the Tartar: "Argol is boiled in water, and the solution allowed to cool, by which a deposit of crystals is obtained; these are washed with cold water, and dissolved in boiling water containing charcoal and alumina (clay), the latter substances being employed to remove the coloring matter with which they precipitate. The clear liquor is allowed to cool slowly, by which crystals are formed. These constitute the *tartarus depuratus*, or *crystals of tartar* of the older chemists. If a hot, saturated solution of tartar be cooled, the surface of the liquid becomes coated by a layer of very fine crystals of Bitartrate: hence this crust was called *Cream of Tartar*."

Bitartrate of Potassa, when first prepared, is in the form of white cakes, with obscure crystallization on one of the surfaces; the crystals being of small size, and in oblique rhombic prisms. But as more generally met with it is in the form of a fine, white powder. The crystals are inodorous, gritty, and of an agreeable acid taste, not altered by exposure to the air, easily reduced to powder, have the sp. gr. 2.4, are soluble in ninety parts of temperate, and fifteen of boiling water, not soluble in alcohol, and are charred and decomposed by a red heat, swelling up, emitting an odor of caramel, disengaging empyreumatic oil, pyrotartaric acid, and various gases, and leaving carbonate of potassa. The *black flux* of chemists is composed of one part Bitartrate of Potassa, and half a part of nitrate of potassa, mixed and heated together; a residuum is left of carbon and carbonate of potassa. If the nitre be doubled the carbonate will remain without the carbon, forming *white flux.* Cream of Tartar is readily soluble in water to which borax or boracic acid has been added, forming a solution, termed *Soluble Cream of Tartar*: It is *incompatible* with ammonia, carbonate of potassa, carbonate of soda, magnesia and its salts, lime-water, acetate of lead, strontia, baryta, etc. It is composed of two atoms of acid, 132.96, one of potassa, 47.15, and one of water, 9 = 189.11; its formula is $KO, \bar{T}\ HO$ or $2\bar{T}+KO+Aq$.

As found in commerce, Bitartrate of Potassa is always contaminated with from three to ten per cent. of tartrate of lime; frequently also with copper, which gives it a green tint. These are accidental impurities and may be removed, without any great loss of material, by finely powdering the Cream of Tartar, and digesting it at a gentle heat, with very dilute hydrochloric acid. To detect the *tartrate of lime* agitate the Cream of Tartar with a solution of caustic ammonia, then filter, and add oxalate of ammonia which causes a white precipitate if lime be present. If a large amount of tartrate of lime be present, the ammonia will not dissolve all of the powder. If *copper* be present, ferrocyanuret of potassium added to an aqueous solution will give a chocolate or reddish-brown color. Sulphocyanuret of potassium gives a red color if *iron* be present, and tannic acid gives a bluish-black precipitate when added to the solution neutralized with ammonia. To detect the presence of *racemic acid*, saturate the suspected Cream of Tartar with pure carbonate of potassa, then add lime-water, and afterward sal ammoniac. If the sal ammoniac does not completely dissolve the precipitate caused by the lime-water, racemate of lime is present. Sometimes, however, it is fraudulently adulterated with various white mineral and organic matters. *Carbonate of lime* will cause an effervescence with weak acids; *starch* may be known by the blue color caused upon the addition of iodine; *mineral* substances, by their insolubility in boiling water; *alum*, or *bisulphate of potassa*, by the white precipitate caused upon the addition of chloride of barium, and which is insoluble in nitric acid. The following are the tests of pure Bitartrate of Potassa: It is sparingly dissolved by water; its solution colors litmus paper red; at a red heat it is converted into carbonate of potassa; it is entirely soluble in forty parts of boiling water; forty grains in solution are neutralized by thirty grains of crystallized carbonate of soda, and when then precipitated by seventy grains of nitrate of lead, the liquid remains precipitable by more of the test.

Properties and Uses.—Bitartrate of Potassa is diuretic and laxative. In large doses it occasions severe and long-continued purging of watery discharges, seldom, however, griping, or producing subsequent debility; on this account, it forms an invaluable agent in dropsy. Excessive doses cause gripings and flatulence, with symptoms of gastro-enteritis. Its continued use deranges the digestive functions, and produces emaciation. A combination of sulphur, Bitartrate of Potassa, and confection of senna, is frequently used with advantage as a laxative in piles, prolapsus ani, etc., and in some diseases of the skin. It is frequently combined with jalap, the compound powder of jalap, podophyllin, sulphur, etc. In solution, sweetened with sugar, it forms an agreeable, cooling drink, very useful in many fevers. Dose, as a cathartic, from four to six drachms; as an aperient, one or two drachms; and in dropsy, it may be given in doses of from one to three drachms, in water, four or five times a day. Equal parts of Bitartrate of Potassa, powdered rhatany root, and myrrh, form a good dentrifrice. Two drachms of Cream of Tartar added to a pint of milk, form a *Cream of Tartar whey*, which when diluted with water is sometimes given in dropsical and febrile complaints.—*Plenck.*—*P.*

Off. Prep.—Potassæ Carbonas Purus; Potassæ Tartras; Pulvis Ipecacuanhæ Compositus; Pulvis Podophyllini Compositus; Sodæ et Potassæ Tartras.

POTASSÆ NITRAS.

Nitrate of Potassa.

History.—Nitrate of Potassa (Saltpetre, Nitre, Sal-prunelle), is a salt which was known to the ancients, though, probably, not with sufficient accuracy to enable them to determine it from other salts formed on the surface of the soil by efflorescence. It may be artificially manufactured, although it exists naturally in some soils. It is found in various parts of the globe, as in Europe, Egypt, South America, India, and in several of the United States; but by far the greater part of the commercial article is obtained from India, in which country it exists in great quantity. It is also found in several plants, as tobacco, crawley root, sunflower, nettle, etc. In India, one hundred parts of the soil employed in manufacturing Nitre, contain about two-third parts of this salt. The process of obtaining it, according to Stevenson, consists in lixiviating the soil in an apparatus made for the purpose, and containing wood ashes. Any nitrate of lime contained in the soil, as it passes in solution through the wood ashes, reacts on the carbonate of potassa, producing Nitrate of Potassa, and carbonate of lime. The liquor thus obtained is evaporated and crystallized, forming an impure Nitre, which may be rendered pure by repeated solution in water and crystallization. An essential part of these soils is, that they shall contain decomposing felspar, mica, or other destructible minerals which consist partly of potassa. The production of Nitre from them is promoted by the presence of animal matter, but may also go on without it; so that the Nitric Acid must be formed through the intervention of atmospheric air. The soluble salts of the nitrate soils consist of sulphates, muriates, and Nitrates of Potassa, lime and soda. The nitrates are converted into Nitrate of Potassa by lixiviating the soil over a filter of wood ashes, containing carbonate of Potassa, and then duly evaporating the filtered liquor. Nitre is also prepared in many parts of Europe from soils artificially impregnated with animal matter—from the mortar of old buildings—or from artificial composts consisting of animal substances, decaying vegetables, ashes, and chalk, marl, or lime. The nitrate thus in the first place produced is the nitrate of lime, which is converted into the Nitrate of Potassa by double decomposition with carbonate of potassa; and the salt is then obtained by lixiviation, and purified by repeated crystallization.—*C.*

But little Nitre is procured from its original sources in this country, in consequence of the cheapness of the India salt; this is chiefly imported from Calcutta in bags containing, each, nearly two hundred pounds; the quality of which is very multiform. On reaching this country it is defined by solution and crystallization.

The salt, erroneously termed *South American Saltpetre*, is a nitrate of soda; it is found a few feet below the saline soil of South Peru, in large beds; on reaching this country it is purified by solution and recrystallization. It forms in obtuse rhombohedral crystals, having a bitter taste, slightly deliquescent in moist air, soluble in two parts of cold water, and in less than its own weight at 212°. It fuses by heat. The shape of its crystals, and the yellow color it communicates to flame, will serve to distinguish it from Nitrate of Potassa. Its therapeutical effects are similar to those of Nitrate of Potassa, without so readily disturbing digestion. It is chiefly used in the manufacture of nitric and sulphuric acids, and by firework-makers, but is an unfit ingredient for gunpowder on account of its deliquescence. Nitrate of Potassa is prepared from it by decomposing it with chloride of potassium, or with the red caustic potassa of this country.

Nitrate of Potassa crystallizes in the form of colorless, opaque, or transparent when pure, striated, six-sided prisms, terminated by one, two, or six converging planes. They belong to the right prismatic system. Its taste is sharp, bitterish, and cooling, and it is very brittle.—*Thomson.* One hundred parts of water at 32° dissolve 13.32 parts of this salt; at 65° they dissolve 29.31 parts; at 113°, 74 parts; at 150°, 125 parts; and at 207°, 236 parts; cold is generated during the solution in temperate or cold water. Alcohol of sp. gr. 0.878, dissolves one-hundredth of its weight of this salt, but it is not soluble in pure alcohol. It is permanent in dry air. Heat fuses it, and when raised to redness drives off oxygen, and converts it into hyponitrite of potassa. In consequence of this evolution of oxygen, it greatly enlivens combustion when thrown on burning fuel. When allowed to cool from a state of fusion, it concretes into a hard, fibrous, opaque, white mass, known in commerce by the name of *Sal-prunelle* or *Crystal Mineral.* Nitre contains no water of crystallization, but there are often cavities in which some of the mother-waters become mechanically lodged. It consists of one equivalent of each of its constituents, or 54.15 parts of nitric acid and 47.15 of potassa$=$101.30. Its formula is NO_5+KO. Dissolved in three hundred times its weight of water, Nitre promotes vegetation; but a solution containing one-thirtieth part of it, is injurious to the growth of plants. It communicates a violet color to flame.

Nitrate of Potassa is sometimes contaminated with alkaline or earthy chlorides or sulphates; nitrate of silver will detect the chlorides by giving a white precipitate; chloride of barium will detect the sulphates by giving a white precipitate; and oxalate of ammonia will cause a white precipitate if lime be present. The presence of chloride of sodium or common salt renders Nitre unfit as a constituent of gunpowder. When Nitre is fused and allowed to cool, it assumes a radiated texture; the broader these radii are the purer is the salt. If mixed with one-thirtieth part of common salt, the radiated appearance is completely destroyed.

If fifteen grains of pure sulphuric acid be added to twenty-five grains of pure and well-dried Nitrate of Potassa, in a deep platina or porcelain crucible, covered to prevent loss during the desiccation of the salt, and then be exposed to red heat, until there is no longer any diminution of weight, a residue should be furnished, weighing twenty-one and a half grains; if less than this, and chlorides and sulphates are absent, nitrate of soda is probably an impurity in the salt.

To form the nitrum tabulatum or sal prunella, some ounces of nitrate of potassa are fused in an iron spoon, which has, in its side, about a quarter of an inch from its edge, a small hole bored about the size of a pin's head, through which the fused mass is allowed to pour on to a clean sheet of iron or copper, and so on with fresh quantities of salt. When subsequently fusing, care must be taken that none of the fused salt adheres to the outside of the spoon, as on coming in contact with the coal it will deflagrate and form carbonate; for the same reason, no coal must be allowed to fall into the spoon. Excepting a small quantity of Nitrite of Potassa which is formed during the fusion, the fused Nitrate of Potassa exactly resembles, in its chemical composition, the ordinary saltpetre.—*Witt.*

Properties and Uses.—Nitrate of Potassa is irritant, cathartic, refrigerant, and diuretic. In doses of from half an ounce to two ounces, in solution, it occasions heat and pain in the stomach, vomiting, excessive, nervous depression, and sinking of the pulse; and has proved fatal in a few hours. On account of the uncertainty of its cathartic effects, it is seldom used for that purpose. Its most common actions are to increase the cutaneous and renal secretions, to diminish the temperature of the system and the frequency of the pulse, to keep the bowels gently open, and, in consequence of these influences, to lessen febrile and inflammatory action.

In the *Am. Jour. Med. Sci., vol. XVIII., p.* 204, an account is given of experiments by five students on their own persons, while in health. The salt was taken in solution, with the addition of a little mucilage, in quantities increasing gradually from one to five drachms daily; the proportion for each day being divided into five doses. After from eight to twelve days' use of it in this manner, it was found to produce general weakness, indisposition to mental or physical exertion, fatigue from the least exertion, low spirits, a bruised sensation of the muscles and joints, constant disposition to sleep, slow and weak pulse. The appetite continued good, and digestion was not disordered, occasionally pain in the bowels, with purging. Blood drawn from the veins at this time had the color and density of cherry-juice, the white blood-corpuscles were increased in number and size, the blood-globules were paler, and the blood coagulated very quickly. There was an increase of the water, and a decrease of the solids of the blood, with a diminution of its fat, and an increased proportion of ash in the serum. The pulse did not assume its natural strength and frequency for several days after the discontinuance of the medicine. Nitre is extensively employed as a diuretic, and especially in dropsical affections. It has also been found beneficial in acute rheumatism, and in active hemorrhages; and in these cases it may be given to the amount of an ounce or two in the course of twenty-four hours, dissolved in two quarts of cold water and flavored with lemon-peel, and which must be divided into several doses. From three to five grains of Nitre dissolved in half a gill of water, and this dose repeated three times a day, I have found very efficacious in removing the aching pain in the testicles complained of by onanists and persons who commit excessive venery. I am not aware that this action is named in any other medical work. In sore-throat, Nitre mixed with white sugar, and gradually swallowed, has given relief; it also forms a useful addition to gargles in quinsy. A mixture of Nitre and gum arabic lessens the scalding of gonorrhea. The fumes produced by the deflagration of Nitrate of Potassa with paper have been inhaled with benefit in spasmodic asthma. To obtain them, blotting-paper must be moistened with a saturated solution of the salt, and then dried; by burning the paper or smoking it in a pipe, the fumes may be inhaled; relief usually follows in about fifteen minutes. It is frequently substituted for the bitartrate of potassa in our powder of ipecacuanha and opium. Sal-prunelle has been found useful as an application to cracked lips. The dose of Nitre as a sedative refrigerant, is from ten to twenty grains, well diluted; and as a diuretic, from twenty to sixty grains. There is no certain antidote known to the more serious influences of Nitre; the treatment generally pursued is to evacuate the stomach by free emesis, and combat gastric irritation by external counter-irritants, mucilage and opiates internally, and stimulants to overcome any tendency to prostration. When used as a medicine, Nitre should be largely diluted with water; large doses, or a continued use of it for some time, will cause gastro-intestinal pain.

Off. Prep.—Acidum Nitricum Purum; Collodium; Potassæ Sulphas cum Sulphure; Pulvis Asclepidis Compositus; Spiritus Ætheris Nitrici; Unguentum Sulphuris Compositum.

POTASSII FERROCYANURETUM.

Ferrocyanuret of Potassium.

History.—This salt is obtained by placing a mixture of two parts of pearlash, with five parts of animal matter, such as hoofs, horns, and other nitrogenous animal matters into an iron crucible, calcining the mixture at a red heat, and constantly stirring the mass until it ceases to give out fetid vapors. The calcined product is then cooled, dissolved in water, and concentrated by evaporation so that crystallization ensues. These are purified by repeated crystallization. It may also be obtained by boiling purified Prussian blue in a solution of potassa, until the blue color disappears, filtering the liquor, evaporating, and crystallizing several times to render it pure.—*C.*

Ferrocyanuret of Potassium occurs in broken or entire crystals of large size, whose form is usually a rectangular prism, truncated on the ends and edges, or a four-sided table derived from the rhombic octaedre by excessive truncation of the apices. The crystals are large, of a honey-yellow color, transparent, of sp. gr. 1.832, have at first a sweetish-bitter, but afterward saline taste, are permanent in the air, are soluble in four parts of cold water, and in two of boiling, are not dissolved by alcohol, which precipitates them from their aqueous solution in brilliant yellow flakes. At a gentle heat below 212°, their water of crystallization is expelled, leaving a white, anhydrous salt. A low red heat decomposes the salt, converting it into cyanuret of potassium, carburet of iron, and other compounds. The persalts of iron are precipitated of a rich blue color by it; those of protoxide of iron, white, quickly passing to blue; those of zinc and lead white, and of copper chestnut-brown. The precipitates occasioned are ferrocyanurets or ferrocyanides of the metals acted upon. Ferrocyanuret of Potassium is regarded by some as a compound of two equivalents of cyanide of potassium and one equivalent of cyanide of iron, with three equivalents of water of crystallization ($2\ \text{K Cy}+\text{Fe Cy}+3\ \text{Aq.}$), and consequently of 39.15 parts of potassium, 79.17 of cyanogen, 28 of iron, and 27 of water. Its equivalent weight is 211.2. According to Liebig and Gregory, it is composed in the anhydrous state of two equivalents of potassium and one of a compound radical called ferrocyanogen, and which consists of three equivalents of cyanogen and one of iron ($Fe, Cy_3+2 K$).—*C.*

Properties and Uses.—Ferrocyanuret of Potassium is not poisonous, being absorbed and carried off quickly with the urine. Large doses are said to cause giddiness, debility, occasional non-fetid salivation, and ulceration of the mouth. From five to twelve grains dissolved in water, and repeated two or three times a day, have been found efficacious as a sedative and calmative in febrile diseases, pertussis, tic-doloreux, etc. It has also proved advantageous in chronic bronchitis, and night-sweats. It is much used in the preparation of hydrocyanic acid, and as a reagent for detecting iron in solution; a mere trace of iron in solution, occasions a blue precipitate with it.

Off. Prep.—Acidum Hydrocyanicum Dilutum; Ferri Ferrocyanuretum; Potassii Cyanuretum.

POTENTILLA CANADENSIS.

Five-finger.

Nat. Ord.—Rosaceæ. *Sex Syst.*—Isocandria Polygynia.

THE ROOT.

Description.—This is a perennial, villose-pubescent plant, frequently known by the name of *Cinque-foil.* It has a sarmentose, procumbent and ascending *stem* from two to eighteen inches in length. The *leaves* are palmately five-foliate, the *leaflets* obovate, silky beneath, cut-dentate toward the apex, entire and attenuate toward the base. *Stipules* ovate, hairy, deeply two or three-cleft, or entire. The *flowers* are yellow, on long, axillary, solitary pedicels. The *calyx-segments* are lanceolate or linear; *bracteoles* of the calyx longer than the segments, and nearly as long as the petals; *petals* obcordate, and longer than the calyx. There are two varieties of this plant, the *Potentilla Pumila*, which is very small and delicate, flowering in April and May, and growing in dry, sandy soils, the stem rising about three or four inches. The other is the *Potentilla Simplex*, which is less hirsute, with a simple *stem*, erect or ascending at base, and oval-cuneiform leaflets; it grows in richer soils to twelve and sixteen inches high, and flowers from June to August.—*W.*—*G.*

History.—Five-finger is common to the United States, growing by roadsides, on meadow banks and waste grounds, and flowering from April to October. It is the *Potentilla Sarmentosa* of some botanists. The root is the part used; it has a bitterish, styptic taste, and yields its virtues to water.

Properties and Uses.—This plant is a tonic and astringent. A decoction has been found useful in fevers, bowel-complaints, night-sweats, menorrhagia, and other hemorrhages; also, it is an excellent local application in form of gargle, for spongy, bleeding gums, and ulcerated mouth and throat. The European herb, *Potentilla Reptans*, possesses similar properties.

Off. Prep.—Decoctum Potentillæ.

POTENTILLA TORMENTILLA.

Tormentil.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE ROOT.

Description.—Tormentil or *Septfoil*, is the *Tormentilla Erecta* of Willdenow, and the *Tormentilla Officinalis* of Smith. It has a perennial, tough, woody *root* or *rhizoma*, about the thickness and length of the upper joint of the fore-finger, with numerous radicles. The *stems* are slender, weak, erect, often procumbent, branching at summit, and five or ten inches high. The *leaves* are almost sessile, and consist of three, oblong, acute, deeply serrated, somewhat hairy *leaflets*; *stipules* smaller than the leaflets, deeply cut. The *flowers* are small, bright-yellow, with the parts of the calyx and corolla in fours, on slender axillary hairy stalks much longer than the leaves. *Carpels* corrugated when ripe.—*L.*

History.—Tormentil or Septfoil is a plant common to Europe. All parts of it are astringent, but the root is the part usually employed. It has a very irregular external form, being sometimes cylindrical, at others tuberculated. Externally, it is of a dark red-brown color; internally, flesh-red or brownish. Its taste is strongly astringent, and its odor faintly aromatic. Water takes up its astringent principle; the infusion forms a black-greenish precipitate of tannate of iron with the sesquichloride of iron, and a grayish curdy one of tannate of gelatine, with a solution of gelatine. In the Feroe and Orkney islands it is used to tan leather; in Lapland it is used to dye red. It contains volatile oil, tannic acid, coloring matter, resin, cerin, myricin, starch, gummy extractive, woody fiber, etc. It is equally applicable in medicine with catechu, kino, and other foreign astringents.

Properties and Uses.—Tormentil is astringent and tonic, and may be used in chronic diarrhea and dysentery, passive hemorrhages, etc., in decoction: also as an astringent injection, and as a local application to flabby ulcers. Dose of the decoction, one or two fluidounces; of the extract, ten or fifteen grains; of the powdered root, from thirty to sixty grains, three or four times a day. The extract may be made by boiling one part of the coarsely bruised root with eight parts of water; straining; repeating the boiling with another equal quantity of water; mixing the two strained decoctions; and evaporating to the consistence of an extract. Alum, or tannic acid may be added to this, as required.

Off. Prep.—Decoctum Tormentillæ.

PRINOS VERTICILLATUS.

Black Alder.

Nat. Ord.—Aquifoliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE BARK AND BERRIES.

Description.—This is an indigenous shrub of irregular growth, sometimes known as *Winterberry*, having a *stem* six or eight feet in height, with a grayish bark, and alternate *branches.* The *leaves* are alternate, or scattered, on short petioles, oval, acute at the base, pointed, sharply serrate, of an olive-green color, smooth above, and downy beneath, particularly on the veins. The *flowers* are small, white, diœcious, on very short peduncles; the fertile ones somewhat clustered or solitary; the sterile ones sub-umbellate; sometimes the flowers are monœcious. The *calyx* is small, six-cleft, persistent. *Corolla* monopetalous, spreading, without a tube, the border divided into six obtuse segments. The *stamens* are equal in number to the segments of the corolla, erect, with oblong anthers; in the fertile flowers they are shorter than the corolla, in the sterile they are equal in length to it. The *ovary* is large, green, roundish, with a short style and obtuse stigma. The *fruit* consists of bright scarlet, globular berries, about the size of a pea, supported by the persistent calyx, and crowned with the stigma, six-celled, containing six long seeds, which are convex outwardly, and sharp-edged within. The berries are in scattered groups on the stem, forming small, apparently verticillate bunches.—*L.* —*W.*

History.—Black Alder is common throughout the United States, growing in moist woods, swamps, edges of streams, etc., flowering from May to July, and maturing its fruit in the latter part of autumn. The bark and berries are officinal. The dried bark of the shops is in pieces either flat or slightly quilled, thin, white with a greenish tint within, brownish-gray externally, readily pulverizable, inodorous, but of a bitterish, subastringent taste. It yields its properties to water by infusion or decoction. The berries have a saccharine, amarous taste, and yield their virtues to water or alcohol; they should not be substituted, in practice, for the bark. These have not been analyzed.

Properties and Uses.—Black Alder is tonic, alterative, and astringent. It has been used with good effect in jaundice, diarrhea, gangrene, and all diseases attended with great weakness; it has also been of service in dropsy. Two drachms of the powdered bark and one drachm of powdered golden-seal infused in a pint of boiling water, and when cold, taken in the course of the day, in doses of a wineglassful, and repeated daily, has proved very valuable in dyspepsia. Externally, the decoction forms an excellent local application to gangrene, to indolent ulcers, some affections of the skin, etc. The berries are cathartic and vermifuge, and form, with cedar-apples, a pleasant and effectual worm medicine for children. (See

Juniperus Virginiana.) Dose of the powdered bark, from half a drachm to one drachm; of the decoction, four fluidounces three or four times a day. Black Alder bark is an ingredient of several alterative syrups.

Off. Prep.—Decoctum Prinos.

PRUNUS VIRGINIANA.

Wild-cherry.

Nat. Ord.—Drupaceæ, *De Candolle;* Amygdaleæ, *Lindley.* *Sex. Syst.*—Icosandria Monogynia.

THE BARK.

Description.—This tree is the *Cerasus Serotina* of De Candolle, and the *Cerasus Virginiana* of Michaux; it is a large tree, generally from fifty to eighty feet high, from two to four feet in diameter, being of uniform size and undivided to the height of twenty or thirty feet. The *bark* is black and rough, which separates naturally from the trunk in thick, slender laminæ. The *wood* is compact, fine-grained, and receives a fine polish, and is extensively used by cabinet manufacturers. The *leaves* are deciduous, oval-oblong, acuminate, finely and unequally serrate, with incurved, short and callous teeth, thickish, smooth, no hairs on the under side, shining above, from three to five inches long, half as wide, and on petioles which are furnished with one or two pairs of reddish glands. The *flowers* are white, and disposed in long, erect, terminal racemes, with a small, solitary flower now and then in the axil of the leaves next the raceme. *Bracts* inconspicuous. *Calyx* with sharp shallow segments. The *fruit* is a globular drupe about as large as a pea, of a purplish-black color, edible, but having a bitter taste.—*L.*—*W.*—*G.*

History.—The Wild-cherry tree is found in many parts of the United States, but is most abundant, and attains the greatest magnitude, in the south-western States. Its flowers appear in May, and the fruit ripens in August and September. The officinal portion is the bark, and that of the root should be preferred to that of the trunk or branches. It should be renewed annually, as its properties are much impaired by age. As dried and prepared for use, it is in fragments of varying length and width, from one to six or eight inches by six lines to three inches, somewhat curved, having the epidermis removed, of a cinnamon color with a slightly red tint, friable with a short fracture, and easily reduced to a fawn-colored powder. Its odor is prussic, which is in a measure lost by drying, but regained by maceration; its taste is aromatic, prussic, and bitter. Water or alcohol takes up its virtues; boiling impairs its medicinal qualities, by driving off the hydrocyanic acid. That gathered in the fall of the year is the best. Dr. S. Procter found it to contain a light straw-colored, pungent oil, of a prussic odor, and highly poisonous owing to the hydrocyanic acid contained in it, having a sp. gr. 1.046; two drops of it killed a cat in a few minutes; he also found in it tannic and gallic acids, starch, resin, salts of lime, potassa, and iron, fatty matter, etc. *See Jour. of Phil. Col. of Pharm., Vol. VI., p.* 8. Prof. W. Procter has shown that the volatile oil consists of hydrocyanic acid and hydruret of benzyle, similar to that of oil of almonds, and that these do not pre-exist in the bark, but are the products of the decomposition of amygdalin, by the reaction of emulsin.—*Am Jour. Pharm., Vol. X., p.* 197.

Properties and Uses.—Wild-cherry bark has a tonic and stimulating influence on the digestive apparatus, and a simultaneous sedative action on the nervous system and circulation. It is therefore, valuable in all those cases where it is desirable to give tone and strength to the system, without at the same time causing too great an action of the heart and bloodvessels, as, during convalescence from pleurisy, pneumonia, acute hepatitis, and other inflammatory and febrile diseases. It is also useful in hectic fever, cough, colliquative diarrhea, some forms of dyspepsia, hooping-cough, irritability of the nervous system, etc., and has been found an excellent palliative in phthisis. It has likewise been of service in scrofula and other diseases attended with much debility and hectic fever. Externally it has been found useful in decoction as a wash to ill-conditioned ulcers. Dose of the powdered bark, one or two drachms; of the infusion, one ounce of bark to one pint of cold water, and allowed to stand a few hours, from one to four fluidounces, four or five times a day, and which is the best mode of using it.

Prunin is an agent obtained from Wild-cherry bark, but devoid of any hydrocyanic acid. It is mildly tonic and astringent, in the dose of from two to ten grains. As we have several superior tonics and astringents, and at a much less cost, I do not perceive any necessity for this one, which is decidedly inferior to many others that might be procured from crude plants. Unfortunately some persons are so wrapped up in what are called "concentrated remedies," that they will blindly employ any thing presented as such, without stopping to inquire or examine into its claims. This is decidedly wrong.

The **Prunus Domesticus**, or cultivated *Prune* or *Plum Tree*, may be referred to here. The dried or prepared fruit is the only officinal part, and furnishes the *Prunes* of commerce. The best prunes come from Bordeaux; some are received from Germany, but they are of a poor kind. Prunes are prepared in warm countries by placing them on hurdles, an drying them by solar heat; in colder climates artificial heat is employe They have a faint, peculiar odor, and a sweetish, slightly acidulous an viscid taste. The ripe fruit contains sugar, gum, albumen, malic acid, pectin, vegetable fiber, etc. In Germany a sort of brandy is prepared from this fruit, and which may be sometimes had of the importers of German liquors. Dried prunes are mildly laxative, and are frequently employed in decoction, or the fruit eaten stewed, in convalescence from acute diseases, forming a nourishing and agreeable diet. They are often added to cathartic decoctions to improve the flavor, and promote the purgative effect. They enter into the composition of the confection of senna. In large quantities, and with some dyspeptics, they are apt to disorder the bowels. The following preparation has been administered with much success in leucorrhea, irregular menstruation, and in debility from frequent abortions: Take of small raisins, or dried currants, two ounces, aniseed, mace, and cinnamon, of each, half an ounce, and one nutmeg in powder; to these add one quart of prune brandy, and let them macerate for two weeks, frequently agitating. This is the formula as originally given. Of the clear tincture thus made, one fluidounce may be given previous to a meal, and repeated three times daily.

Off. Prep.—Infusum Pruni Virginianæ; Tinctura Laricis Composita; Vinum Cinchonæ Compositum.

PTELEA TRIFOLIATA.

Wafer-ash.

Nat. Ord.—Xanthoxylaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE BARK OF THE ROOT.

Description.—This plant is also known by the name of *Wingseed*, *Shrubby Trefoil*, and *Swamp Dogwood*. It is a shrub from six to eight feet in height, with the *leaves* trifoliate, and marked with pellucid dots; the *leaflets* are sessile, ovate, short acuminate, downy beneath when young, crenulate, or obscurely toothed; lateral ones inequilateral, terminal ones cuneate at base, from three to four and a half inches long by one inch and a quarter to one inch and three-quarters wide. The *flowers* are polygamous, greenish-white, nearly half an inch in diameter, of a disagreeable odor, and disposed in terminal corymbose cymes. *Stamens* mostly four; *style* short. *Fruit* a two-celled samara, nearly an inch in diameter, winged all round, nearly orbicular.—*G.*—*W.*

History.—Wafer-ash, or Ptelea, is a shrub common to this country, growing more abundantly west of the Alleghanies, in shady, moist hedges and edges of woods, and in rocky places; it flowers in June. The bark of the root is officinal, and yields its properties to boiling water; but alcohol is its best solvent. It is, when dried, of a light brownish-yellow color externally, in cylindrical rolls or quills, a line or two in thickness, and from one to several inches in length, irregularly wrinkled and furrowed externally, with broad, transverse lines or rings at short but irregular intervals, and is covered with a thin epidermis; internally it is yellowish-white, but becomes darker on exposure, and is wrinkled longitudinally; it is brittle, with an almost smooth, resinous fracture, granular under the microscope, resembling wax. It has a peculiar smell, somewhat similar to that of liquorice-root, and a peculiar bitter, resinous, pungent, acrid, and rather disagreeable taste, speedily and powerfully acting upon the mouth and fauces, and the pungency of which is persistent, and which is probably owing to its oil. It has not been analyzed. The fruit is bitter and aromatic. This bark is the one described by Prof. I. G. Jones in the first edition of his work on Theory and Practice, under the name of *Staphylea Trifolia*, but which he subsequently ascertained to be incorrect.

Properties and Uses.—Ptelea is tonic. Used in intermittent fevers, remittent fevers, and all cases of debility where tonics are indicated. Said also to be anthelmintic. Equal parts of Ptelea and the Euonymus Atropurpureus, have been found very useful in pulmonary affections. A tincture of Ptelea, made in whisky, is reputed to have cured several cases of asthma, and it is said to cause, in many instances where it has been used, a troublesome external erysipelatous inflammation, either general or local, but which, if the use of the tincture be persisted in, finally disappears, and the patient becomes at the same time permanently cured of the disease for which he was treated. This would certainly indicate other valuable properties in this plant, than those with which we are acquainted, and deserves a further and thorough investigation. Prof. I. G. Jones states that this bark is a pure, unirritating tonic, having rather a soothing influence when applied to irritated mucous membranes. He has employed it advantageously in convalescence after fevers, and in debility connected with gastro-enteric irritation. It promotes the appetite, enables the stomach to endure suitable nourishment, favors the early re-establishment of digestion, and will be tolerated by the stomach, when other tonics are rejected. He employs it in cold infusion, of which half a fluidounce may be given every two, three, or four hours, according to circumstances. It is also said to cure intermittent fever, and is considered by some to be equal to quinia. (See "*Jones' American Practice*" by Prof. Wm. Sherwood, M. D., a valuable work, which should be found in the library of every medical man.) It may be used in powder, tincture, or extract. Dose of the powder, ten to thirty grains, three or four times a day; of the tincture, one or two fluidrachms; of the extract, five to ten grains.

Off. Prep.—Extractum Pteleæ Hydro-alcoholicum; Infusum Pteleæ; Ptelein.

PTELEIN.

Ptelein.

THE OLEO-RESINOUS PRINCIPLE OF PTELEA TRIFOLIATA.

Preparation.—Make a saturated tincture of the bark of Ptelea Trifoliata, add to it twice its volume of water, and distill off the alcohol; the Ptelein remains in the water, from which it must be separated.

History.—Ptelein, I believe, was first prepared by Mr. W. S. Merrell, and is obtained from the tincture of the bark by precipitation with water, in the same manner by which podophyllin, iridin, eupurpurin, etc., are obtained. It is of the consistence of thick syrup or molasses, dark-brown in mass, much lighter when in thin layers, and has a peculiar odor, somewhat similar to that of the extract of liquorice, and an oily, bitterish, acrid, persistent taste, peculiar and rather disagreeable, and acting powerfully on the fauces. It is soluble in alcohol, ether, oil of turpentine, and rather imperfectly in alkaline solutions; insoluble in acids and water. It imparts a slight milky color to water, and separates into two portions, one of which floats on the water, while the other sinks. Acetic acid added to its alcoholic or ethereal solution does not disturb them, unless added in excess. Water added to the alcoholic solution produces a milky color, precipitating the resin; added to the ethereal solution it separates the oil, which floats on the surface.

Properties and Uses.—Ptelein is a tonic, and possesses other properties not yet satisfactorily understood. It is a valuable medicinal agent, which should receive the especial attention of the profession. I have used it extensively and successfully in cases of dyspepsia, combined with equal parts of xanthoxylin, and given in doses of one or two grains, repeated three times a day; if constipation be present, I have found the following an admirable combination: Take of Ptelein nineteen grains, alcoholic extract of nux vomica one grain, white sugar, or lactin, two drachms. Mix thoroughly together; the dose is six grains to be repeated three or four times a day. I have found the following a valuable pill in chronic erysipelas, hepatic torpor, enlarged spleen, habitual constipation, chronic dysentery, and some forms of dyspepsia: Take of podophyllin and leptandrin, of each, one grain, sulphate of quinia four grains, Ptelein eight grains; mix these together, and divide into eight pills. The dose is one pill, to be repeated two or three times a day, and the alkaline bath to be used daily.

PTERIS ATROPURPUREA.

Rockbrake.

Nat. Ord.—Filices; Polypodiaceæ, *Brown*. *Sex. Syst.*—Cryptogamia Filices.

THE PLANT.

Description.—Rockbrake is an indigenous perennial fern, with a *frond* from six to ten inches in height, twice as long as wide, of a grayish hue, pinnate, the two lower divisions consisting of from one to three pairs of leaflets, with a large, terminal segment. The *stipe* and *rachis*, dark-purple, shining, with dense, paleaceous hairs at base. The *lower leaflets* ternate or pinnate, lanceolate, obtuse, distinct, obliquely truncate or subcordate at base, with margins conspicuously revolute. *Involucre* rather broad, formed of the inflected margin of the frond, and opening inwardly. *Sori* in a broad continuous line along the margin of the frond. The several varieties of this species possess similar properties, as the *Pteris Venosa*, with the *stipe* angled, and the *leaflets* veined beneath; *P. Punctata*, with the *stipe* terete, and the leaflets punctate beneath.—*W.*—*G.*

The PTERIS AQUILINA or *common Brake* likewise possesses analogous virtues. It is a fern from two to five feet in height, upon a smooth, dark-purple, erect *stipe*. The *frond* is pinnate, three-parted, broad-triangular in outline. The *branches* are bipinnate. The *leaflets* linear-lanceolate; the lower ones pinnatifid, the upper ones entire; *segments* oblong, obtuse. *Sori* covered by the folding back of the margins of the segments.—*W.*

History.—Rock-brake is common to the United States, usually growing on limestone rocks; the common Brake is found in greater abundance, in woods, pastures, waste grounds, and stony hills. The whole plant is used in medicine, and imparts its virtues to water. No analysis has been made of it. As found in the shops, the dried root consists of a long cylindrical caudex, of a dark-brown color externally, and light brownish-red internally, of an astringent, leathery taste and around which are closely arranged, overlapping each other like the shingles of a roof, the remains of the leafstalks or stipes, which are an inch or two in length, from two to four lines thick, somewhat curved and directed upward, angular, dark-brown, furrowed longitudinally, and from between which, emerge numerous small radical fibers. The dried leaves are of a light-grayish or greenish-yellow color, of an odor resembling that of sole leather, and a leathery, astringent, not disagreeable taste. As sold, it is usually in broken fragments.

Properties and Uses.—Rockbrake is astringent and anthelmintic. A decoction of it, taken moderately, has proved efficacious in diarrhea, dysentery, night-sweats, aud hemorrhages; and used as a local application, it is beneficial in obstinate and ill-conditioned ulcers, ulcerations of the mouth and fauces, and, as a vaginal injection in leucorrhea. A strong decoction is in some repute as a remedy for worms. A powerful astringent infusion may be made by adding four drachms of the plant to one pint of boiling water, and which has been used in diarrhea and dysentery, in half fluidounce doses repeated every two or three hours, with success.

A plant called *Winter-fern* or *Brake* is much employed in amenorrhea, and in suppression of the lochia; it is used in infusion, and taken freely. By some it is supposed to be the *Pteris Atropurpurea;* but of this I am not positive, not having been able to obtain a perfect specimen of the plant for examination. Both the roots and tops are used, and are worthy the attention of the practitioner in the above-named derangements.

PTEROCARPUS SANTALINUS.

Red Saunders.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE WOOD.

Description.—This is a lofty forest tree. The *leaves* are alternate, stalked, ternate, rarely pinnate; the *leaflets* are alternate, petiolate, the uppermost larger, ovate-roundish or oblong, entire, emarginate or retuse, smooth above, hoary beneath; *stipules* wanting. The *flowers* are yellow, with red veins, papilionaceous, and disposed in axillary, simple or branched, erect racemes. *Bracts* none. *Calyx* brown, five-cleft. *Stamens* ten, combined into a sheath, split down to the base on the upper side, and half-way down on the lower. *Legume* roundish, long-stalked, falcate upward, compressed, smooth, keeled on the lower edge; *keel* membranous and undulated. *Seed* solitary.—*L.*

History.—This is a large forest tree inhabiting Ceylon, and the mountains of the opposite Coromandel coast on the Indian continent. The wood is the officinal *Red Saunders* or *Red Sandal wood.* It is imported in billets which are dense, heavy, dark-brown externally, and internally dark-red with light-red rings. It is usually kept in the shops in the state of small chips, raspings, or coarse powder. It has a faint, peculiar odor, and an obscurely astringent taste, and is of difficult pulverization. Coloring woods generally communicate their color to water, which is not the case with Red Saunders; this, however, gives to alkaline solutions, ether, and alcohol, a scarlet color. The alcoholic solution gives with solutions of lead a violet colored deposit, with corrosive sublimate a scarlet, and with sulphate of iron a deep violet. About seventeen per cent. of a yellow resinoid, coloring principle was obtained from it by Pelletier, which became red from the action of the air; he named it *Santalin* $C_{16}H_{16}O_3$. It may be obtained either by precipitation of the tincture with water, or by preparing an infusion with an alkaline solution, and precipitating with an acid. It is tasteless, insoluble in water, slightly soluble in oils, readily soluble in alcohol, ether, or acetic acid, and readily soluble without decomposition in alkalies; the acetic solution is somewhat astringent to the taste, and is precipitated by solution of gelatin. It is said to have an acid reaction.

Properties and Uses—Tonic and astringent; formerly used for these indications, but at present employed only for coloring tinctures, etc.

PULMONARIA OFFICINALIS.

Lungwort.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—This is a rough plant, with a *stem* about one foot in height. The *radical leaves* are ovate, cordate, scabrous, and the *cauline ones* ovate and sessile. The *flowers* are blue, and in terminal clusters. The *calyx* is prismatic, five-angled, five-toothed, and as long as the tube of the corolla; the *corolla* is infundibuliform, with a cylindric tube, orifice hairy in five lines alternating with the stamens; *stigma* emarginate; *achenia* roundish, obtuse, imperforate at base.—*W.*

History.—This is a herbaceous perennial, growing in Europe and this country, in northern latitudes. In Europe it is a rough-leaved plant, but in this country the whole plant is smooth. The *Mertensia Virginica*, or

Virginian Lungwort, or *Cowslip*, is frequently employed in the United States; it is the *Pulmonaria Virginica* of Linnæus, and the *Lithospermum Pulchrum* of Lehman. It is a smooth, erect and elegant plant, about twenty inches in height, the *radical leaves* of which are obtuse, obovate-elliptical, and become from five to six inches long, and about two-thirds as wide, many-veined, and the *cauline* are long-lanceolate and sessile. The *flowers* are blue, and in terminal clusters. The *calyx* five-cleft, much shorter than the tube of the corolla, limb longer than the tube; the corolla is nearly an inch long, funnel-form, four times the length of the calyx, naked in the throat, and the much-spreading border slightly five-lobed, *stamens* and *style* included; *filaments* slender. *Disk* bearing two glands as long as the ovaries. The stem and leaves are usually pellucid-punctate. This plant is found in alluvial banks, growing from western New York to Georgia and the Western States, and flowering in May. Being a showy plant it is frequently cultivated. The leaves of these plants are the parts used; they are without odor, and have a faint astringent, somewhat viscid taste. Water extracts their properties.—*W.—G.*

Properties and Uses.—Demulcent and mucilaginous, and may be used in decoction, whenever this class of agents is indicated. They have been much used in bleeding from the lungs, bronchial and catarrhal affections, and other disorders of the respiratory organs.

PUNICA GRANATUM.

Pomegranate.

Nat. Ord.—Myrtaceæ. *Sex. Syst.*—Icosandria Monogynia.

THE RIND OF THE FRUIT AND BARK OF THE ROOT.

Description.—Pomegranate is a small tree or shrub, with spinescent branchlets. The *leaves* are opposite, oblong, inclining to lanceolate, entire, smooth, with no marginal vein, two or three inches long by five or ten lines wide, obtuse, deciduous, shortly petioled, rarely verticillate or alternate, often axillary and fascicled. The *flowers* are large, red, two or three, nearly sessile on somewhat terminal branchlets. The *calyx* is turbinate, five-cleft, thick, pale, succulent; æstivation valvate. *Corolla* consists of five much crumpled, membranous petals. The *stamens* are numerous, inserted on the calyx; *filaments* distinct; *anthers* yellow. *Ovary* roundish, inferior; *style* simple, filiform; *stigma* globular, capitate. The *fruit* is a large, globose pericarp, the size of a small muskmelon, leathery, crowned by the prominent hardened tube of the calyx, divided horizontally into two parts by a very irregular, confused dissepiment: the lower division three-celled, the upper five to nine celled: dissepiments membranaceous; placentæ in the lower division at the bottom; in the upper stretching from the side of the fruit to the middle. *Seeds* numerous, angular, covered with a bright red, succulent, acid coat. *Em-*

bryo oblong; *radicle* short, acute; *cotyledons* foliaceous, spirally convolute. —*L.*—*W.*

History.—The Pomegranate grows on the Mediterranean shores, Persia, China, and other countries of Asia, and has been naturalized in the West Indies, and other civilized countries in warm latitudes. It has splendid, dark-scarlet flowers, often doubled, which appear in July and August. The *flowers* have a slightly styptic taste, without odor, and their infusion gives a deep bluish-black precipitate with the salts of the sesquioxide of iron; the saliva is colored a violet-red upon chewing them. Both tannic and gallic acids enter into their composition. In some foreign pharmacopœias, they, together with the seeds, are recognized as officinal. The rose-colored, juicy, acid pulp is edible, and is very grateful to febrile patients. The *root-bark* and the *fruit-rind* are the only parts employed in this country. The *fruit* varies in size and flavor, that of the West Indies becoming the most perfect.

The *Rind of the fruit* (*Granatum*, London, *Punicæ Granati Cortex*, Dublin, or *Granati Fructus Cortex*, United States), when dry, is brown externally, yellow within, about a line in thickness, smooth or finely tuberculated, hard, dry, brittle, in irregular fragments, inodorous, and of a very astringent, somewhat bitter taste. Its infusion gives an abundant, dark-bluish precipitate with the salts of iron. It contains 18.8 per cent. of tannin, 17.1 of mucilage, 10.8 extractive matter, 30 lignin, a trace of resin, and 29.9 moisture.

The *root* is large, ligneous, knotty, and hard, not used in medicine. The *Bark of the root* (*Granati Radicis Cortex*), as found in commerce, is generally in quills, or fragments of quills, from two to six inches in length, and from half an inch to an inch in breadth, and nearly a line in thickness; it is grayish-yellow externally, with green specks, yellow internally, brittle, and not stringy. It has a short fracture, a faint, peculiar odor, an astringent bitter taste when fresh, the bitterness of which is nearly lost by drying. When chewed, it tinges the saliva yellow. Its infusion yields a deep-blue precipitate with the salts of iron, a yellowish white one with a solution of gelatin, a grayish-yellow with corrosive sublimate, and potassa or ammonia colors it purple. Paper which has been colored yellow by the moistened inner face of the bark, changes to blue by the action of sulphate of iron, and to a delicate rose color, which is evanescent, by nitric acid. These changes do not occur with the bark of barberry, or of box-root, which are sometimes fraudulently mixed with it; the box bark is nearly white, bitter, not astringent, and its infusion is not precipitated by salts of iron.—*Guibourt.* The barberry bark very much resembles the Pomegranate, but is very bitter and not astringent, and is not affected by the salts of iron, solution of isinglass, corrosive sublimate, or potassa. The ligneous part of Pomegranate root is inactive, and should, therefore, be always separated from the bark.

Pomegranate bark has been analyzed by several chemists; L. de Trie, found it to consist of granadine or mannite, resin, fatty matter, gallic acid, wax, chlorophyll, and insoluble substances.—*P.* Bonastre says the fresh root contains a little volatile oil. Righini ascribes the properties of the root to an oleo-resin, *punicin*, which he obtained by preparing a dry alcoholic extract from the watery extract, heating this in the vapor-bath with eight parts of water, holding in solution a sixty-fourth of caustic potassa, neutralizing the alkaline solution with sulphuric acid, and washing on a filter with cold water the oleo-resin which it separates.—*C.*

Properties and Uses.—The flowers and rind of the fruit are astringent, and have been used for arresting chronic mucous discharges, passive hemorrhages, aphthous disorders of the mouth, night-sweats, colliquative diarrhea, etc., but are now seldom employed. The rind has also been found serviceable in intermittent fever, and tapeworm. The bark of the root possesses anthelmintic properties, and is chiefly serviceable in tapeworm. The bark of the wild Pomegranate is considered by the French to be more active than the cultivated plant. It may be given in powder, but the decoction is more frequently used. Foy as well as Breton recommend to prepare the decoction by placing two ounces of the root in a pint and a half or two pints of water, and boiling down to one pint; this is to be strained, and from two to four fluidounces given for a dose, every half-hour or hour, until the pint of decoction has been taken. It commonly occasions several stools, an increased flow of urine, or nausea and vomiting, owing, it is supposed, to the agitation into which the worm is thrown from its presence. Sometimes joints of the worm begin to come away in less than an hour after the last dose. But often the doses must be repeated several successive mornings before they take effect, and it is right to repeat them occasionally for four or five days after the joints have ceased to come away. Laxatives should be administered from time to time. It is said to act with the greatest certainty when the joints of the worm come away naturally. The dose of the rind or flowers in powder, is from one to two scruples, and in decoction from one to three fluidounces.—*C.*

Off. Prep.—Decoctum Granati Radicis.

PYCNANTHEMUM PILOSUM.

Pycnanthemum.

Nat. Ord.—Lamiaceæ, or Labiatæ. *Sex. Syst.*—Didynamia Monogynia.

THE PLANT.

Description.—This is an indigenous perennial plant, with long and soft whitish hairs, and a subsimple *stem*, growing from one to two feet in height. The *leaves* are sessile, nearly entire, lanceolate, acute at both ends, and pilose beneath; the floral ones not whitened. The *flowers* are white, and disposed in large, terminal, sessile heads. The *calyx-teeth* are ovate-lanceolate, acute, and with the lanceolate *bracts*, are canescently villous and awnless. The *corolla* is pubescent, and the *stamens* exserted. —*G.*—*W.*

History.—This plant is found in low grounds, dry hills and plains, from Ohio and Illinois extending southward, and flowering in July and August. The whole plant is used and yields its virtues to boiling water; it has the taste and odor peculiar to the Mint family. There are several species of this genus which possess similar medicinal properties, as the *Pycnanthemum Virginicum*, Narrow-leaf Virginian Thyme, or Prairie-Hyssop, a pubescent plant with white *flowers*, sessile, lance-linear, entire, and punctate *leaves*, terminal and corymbed heads, and acuminate *bracts*. Also the *P. Aristatum*, or *Wild Basil*, with lance-ovate, subserrate, pubescent, acuminate, and short petiolate *leaves;* with hirsute, terminal, capitate and subterminal *verticils; bracts* lance-subulate, and with the *calyx* terminated by awns. Likewise *P. Incanum*, and others.—*G.*—*W.*

Properties and Uses.—Pycnanthemum is diaphoretic, stimulant, antispasmodic, carminative, and tonic. A warm infusion is very useful in puerperal, remittent, and other forms of fever, coughs, colds, catarrhs, etc., and is of much benefit in spasmodic diseases, especially colic, cramp of the stomach, and spasms of infants. The cold infusion is a good tonic and stimulant during convalescence from exhausting diseases. Dose of the infusion, either warm or cold, from one to four fluidounces, three or more times a day.

Off. Prep.—Infusum Pycnanthemi.

PYRETHRUM PARTHENIUM.

Feverfew.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—Feverfew is a perennial, herbaceous plant, with a tapering *root*, and an erect, branched, leafy, round, furrowed *stem*, about two feet high. The *leaves* are alternate, petiolate, flat, bipinnate or tripinnate, of a hoary green, with the *segments* or *leaflets* inclining to ovate, decurrent, gashed and dentate. The *flowers* are white and compound. The *panicle* corymbose, sometimes compound; the *peduncles* long, naked, single-flowered, swelling upward. *Flower-heads* erect, about half an inch broad, with a convex yellow disk, and numerous short, broad, abrupt, two-ribbed, white rays; often wanting; sometimes multiplied, and the disk being obliterated, constitutes a double flower. *Involucre* hemispherical, imbricate, pubescent, with the scales scarious at the edge; *receptacle* flat or convex, naked; *achenia* wingless, angular, uniform, crowned by a coroneted *pappus*, which is usually toothed, and occasionally auriculate.—*L.*—*W.*

History.—This is a European plant, and is common to the United States, found occasionally in a wild state, but is generally cultivated in gardens, and flowers in June and July. It is the *Matricaria Parthenium* of Linnæus, and the *Chrysanthemum Parthenium* of Persoon. It imparts its virtues to water, but much better to alcohol. J. Chautard obtained a camphor from this plant which rotates the plane of polarization to the left; by treating this camphor with nitric acid in the way indicated for the conversion of common camphor into camphoric acid, a new acid was obtained, which rotated the plane of polarization to the left exactly to the same extent that ordinary camphoric acid rotated it to the right. If the right and left camphoric acids be mixed a new acid is formed, having no action on polarized light.

Properties and Uses.—Tonic, carminative, emmenagogue, vermifuge, and stimulant. The warm infusion is an excellent remedy in recent colds, flatulency, worms, irregular menstruation, hysteria, suppression of the urine, and in some febrile diseases. In hysteria, or flatulency, one teaspoonful of the compound spirits of lavender forms a valuable addition to the dose of the infusion, which is from two to four fluidounces. The cold infusion or extract, makes a valuble tonic. The leaves in poultice are an excellent local application in severe pain or swelling of the bowels, etc. Bees are said to dislike this plant very much, and a handful of the flower-heads carried where they are, will cause them to keep at a distance.

Off. Prep.—Infusum Pyrethri.

PYROLA ROTUNDIFOLIA.

Round-leaved Pyrola.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE HERB.

Description.—This is a perennial, low, scarcely suffruticose, evergreen herb, known by the various names of *False Wintergreen*, *Shin-leaf*, *Canker-Lettuce*, *Pear-leaf Wintergreen*, etc. The *leaves* are radical or nearly so, orbicular-ovate, nearly two inches in diameter, smooth, shining, thick, entire or crenulate, usually shorter than the petiole, with conspicuous, reticulate veins. The *petioles* are margined, as long as, and usually much longer than the leaf. The *scape* is mostly racemose, three-angled, from six to twelve inches high, with scaly bracts at base and in the middle. The *flowers* are many, large, fragrant, white, drooping, about three-fourths of an inch broad, and disposed in an oblong, terminal raceme. The *calyx* is five-parted, persistent; the *lobes* lanceolate, acute, with somewhat spreading tips, one-half or one-third the length of the petals. *Petals* five, roundish-obovate, nearly spreading, concave, deciduous. *Stamens* ten, ascending; *filaments* awl-shaped, naked; *anthers* large, pendulous; *stigmas* exserted beyond the ring; *style* declining and curved, longer than the petals. *Capsule* five-celled, five-valved, opening at the angles, many-seeded.—*W.*—*G.*

History.—This plant is common in damp and shady woods, throughout various parts of the United States, bearing numerous white flowers in June and July. The whole plant is used, and imparts its medical properties to water. It has not been analyzed.

Properties and Uses.—Round-leaved Pyrola is tonic, astringent, diuretic, and antispasmodic. Used in decoction, both internally and externally in various cutaneous eruptions, likewise in a carcinomatous or scrofulous taint of the system, and in leucorrhea, and some uterine diseases. As a local application it will be found of service in sore-throat, and ulcerations of the mouth, indolent ulcers, ophthalmia, etc., and forms an excellent soothing poultice for boils, carbuncles, and all painful tumors or swellings. The decoction, taken internally, is said to be valuable in many urinary affections, as gravel, hematuria, and ulceration of the bladder, and in some nervous diseases. The decoction and extract have been used with success in convulsions, and form a large portion of a popular nostrum for epilepsy. Dose of the decoction, one or two fluidounces, three or four times a day; of the extract, from two to five grains.

Off. Prep.—Decoctum Pyrolæ Rotundifoliæ.

PYRUS MALUS.

The Apple-tree.

Nat. Ord.—Rosaceæ; *Suborder*, Pomeæ. *Sex. Syst.*—Icosandria Pentagynia.

THE BARK.

Description.—This is a well known tree, growing from twenty to forty feet high, with rigid, crooked, spreading *branches*, and a rough, blackish bark. The *leaves* are from two to three inches long, and about two-thirds as wide, ovate, or oblong-ovate, serrate, acute, or short-acuminate, pubescent above, tomentose beneath, and on petioles from half an inch to an inch in length. The *flowers* are large, fragrant, expanding with the leaves, pale-rose color, and arranged in subumbellate corymbs. The *calyx-tube* is urn-shaped, limb five-cleft; *pedicels* and *calyx* villous-tomentose. *Petals* five, roundish, or obovate, with short claws. *Stamens* numerous; *styles* five, united and villose at base. *Fruit* or *pome* globose.—*W.*

History.—The Apple-tree is a native of Europe, naturalized in this country, and flowers from April to June. There are, probably, nearly one thousand varieties cultivated in the United States, and all of which are said to be derived from the *Wild Crab.* From the fruit cider is manufactured, and both the fruit and its cider are much used for domestic and medicinal purposes. The bark is bitter and has been employed in medicine, it contains a principle called *phloridzin;* the root-bark is the most active, and yields its virtues to boiling water.

Phloridzin or *phloridzite* is a name given by Dr. Koninck, a German physician, to a bitter principle, which exists in the bark of the trunk and roots of the apple, cherry, and plum trees. Its existence was first noticed by Prof. Geiger of Heidelberg, but Dr. Koninck first obtained it in a separate state, and determined its characters. To prepare it, the fresh bark of the root of the Apple-tree is boiled for two hours in a quantity of water sufficient to cover it. This water is decanted off, and the boiling repeated with a second portion, and this last decoction must be kept separate from the first. It commonly deposits in twenty-four hours, a considerable quantity of granular crystals of phloridzin, which, when dissolved in distilled water, and treated with animal charcoal, are rendered quite pure. We obtain an additional quantity by evaporating the liquid down to one-fifth. In this state of concentration, it deposits the whole phloridzin which it contains, when left at rest for a couple of days. About three per cent. of this principle is thus obtained. About five per cent. may be procured by another process, viz.: digest the fresh bark of the root in weak alcohol, at about the temperature of 122°, continuing the digestion for eight or ten hours. The greater part of the alcohol is then to be distilled off, and the residue set aside to crystallize. Purify then the same as in the other process.

Phloridzin has a dull white color, with a shade of yellow, and is crystallized in silky needles; it may also be obtained in tables. It has an intensely bitter taste, is soluble in only the thousandth part of its weight of cold water, but from 76° to 212° dissolves in all proportions. It is very soluble in absolute alcohol, but little soluble in ether, has no action on vegetable colors, and a sp. gr. of 1.4298. At 212° it loses its water of crystallization, which is not absorbed again even in a moist atmosphere; it melts at 227°, and boils at 351°. At 380° it begins to be decomposed, forming benzoic acid, acetone, and a brown oil heavier than water. It is dissolved by the concentrated acids without decomposition, while it retains its water. When anhydrous it forms a reddish-brown solution with sulphuric acid; a white insoluble substance with muriatic acid; heated with nitric acid it is converted into oxalic acid; boiled for eight or ten hours with sulphuric acid it is converted into sugar. The alkalies and concentrated acetic acid dissolve it without alteration. Chlorine, bromine, and iodine, act upon it violently, evolving much heat, and hydrochloric, hydrobromic, and hydriodic acids are respectively given out, while a brown resinous substance is produced, which is soluble in alcohol, but not in water. Persulphate of iron gives with a solution of phloridzin a yellowish-brown precipitate; perchloride of iron, a very dark-brown; protosulphate of iron has no action; diacetate of lead gives a copious white precipitate, which becomes yellow when dry. It is composed of carbon, hydrogen, and oxygen; $C_{42}\,H_{29}\,O_{24}=C_{42}\,H_{23}\,O_{18}+6HO$?

Properties and Uses.—Apple-tree bark is tonic and febrifuge, and a decoction of it has been used with advantage in intermittent, remittent, and bilious fevers, and in convalescence from exhausting diseases. It may be given in doses of from one to four fluidounces, three times a day. A strong decoction or syrup of the Sweet-Apple-tree bark has been employed with success in some cases of gravel. The fruit or apple contains both malic and acetic acids, has a pleasant and refreshing flavor, and is a useful and healthy article of diet. However, it should not be eaten by dyspeptics, or patients afflicted with gout, rheumatism, or renal and cutaneous diseases. When baked, stewed, or roasted, it becomes valuable as an agreeable and healthy diet in febrile diseases, exanthema, etc., and is more easily digested than when raw; it also becomes slightly laxative and is beneficial in cases of habitual constipation. Raw apples should always be well masticated before being swallowed, as otherwise, they may become a source of serious difficulties, especially with children. An Apple tea may be made for fever patients, by boiling a tart Apple in half a pint of water, and sweetening with sugar.

Cider forms not only a refreshing and agreeable drink for patients with fever, but actually exerts a salutary medicinal influence, especially where the tongue is coated brown or black. I have used cider, in which horse-radish has been steeped, as an efficacious remedy in dropsy, for more than twenty-three years; and it is now used in the preparation of a valuable agent for this disease, the *Compound Infusion of Parsley.* Cooked Apples form an excellent local application in ophthalmic inflammation, erysipelatous inflammations, sore and swelled throat in scarlatina, ulcers, etc.

Phloridzin is tonic and antiperiodic, and has cured cases of intermittent fever, even where quinia had proved ineffectual; its dose is from five to twenty grains. Unlike quinia, it does not cause gastralgia.

QUERCUS ALBA.

White Oak.

Nat. Ord.—Corylaceæ, *Lindley;* Amentaceæ, *Jussieu;* Cupuliferæ, *Richard.* *Sex. Syst.*—Monœcia Polyandria.

THE BARK.

Description. — Quercus Alba is a forest tree, varying in size according to the climate and soil, attaining the height of from sixty to ninety feet, with a diameter of from three to six feet. It is covered with a whitish *bark*, often with dark spots. The *leaves* are oblong, pinnatifid, sinuate, smooth, bright-green above, pale or glaucous beneath, dilated above, and obliquely divided into from three to five lobes, which are oblong, or linear, obtuse, mostly entire, and sometimes tapering at their base. The *flowers* are monœcious and amentaceous. The *cup* is hemispherical, naked, much shorter than the acorn, deep, tuberculate. The *acorns* are large, ovate, coriaceous, one-celled, one-seeded, surrounded at base by the cup, and are solitary, or in pairs upon long peduncles.—*W.*—*G.*

QUERCUS RUBRA, or *Red Oak*, is a lofty, wide-spreading tree, attaining the height of about seventy feet, with a diameter of three or four feet. The *leaves* are from six to ten inches in length, on long petioles, oblong, smooth on both sides, pale beneath, obtusely sinuate, with short, and entire or sparingly dentate, mucronate *lobes*, from four to six on each side. The fructification is biennial. The *acorns* are oblong-ovoid, about an inch long, surrounded at base by a saucer-shaped, shallow, even *cup*, very much shorter than the acorn, of very small and close scales, and subsessile.—*G.* —*W.*

QUERCUS TINCTORIA, *Quercitron* or *Black Oak*, is one of the loftiest trees in the forest, frequently attaining the height of from eighty to one hundred feet, with a diameter of four or five feet. The *bark* is deeply furrowed, black or deep-brown. The *leaves* are from six to eight inches long, obovate, oblong, more or less rusty-pubescent beneath, finally glabrous, slightly or sometimes deeply sinuate-lobed, with oblong, obtuse, mucronate, somewhat toothed *lobes.* The *acorns* are brown, nearly spherical or depressed-globose, about one-half immersed in a deep, thick, flat, conspicuously scaly *cup*, which is subsessile. The leaves turn dark-red after frost.—*G.*—*W.*

History.—Quercus is a very extensive and valuable genus, consisting of many species, a large proportion of which grow in the United States. Their usual character is that of astringents, and the three above described are those which have been more particularly employed in medicine. The bark of the tree is the officinal portion.

White Oak grows throughout the Union, but is more abundant in the Middle States. Its wood is strong and durable, and is extensively employed in ship-building, coopering, carriage-making, etc.—*W.* Tanners occasionally make use of its bark, but that of the *Q. Rubra*, *Q. Tinctoria*, *Q. Coccinea* and *Q. Elongata* are commonly used. White-Oak bark is the one chiefly used in medicine. Its epidermis contains no astringency, and should therefore be removed; the bark thus prepared is of a pale-brownish color, faintly odorous, very astringent with a slight bitterness, tough, breaking with a stringy or fibrous fracture, and not readily powdered. Its astringency is imparted to water, or alcohol. Tannic acid enters largely into its composition, together with gallic acid, extractive, woody fiber, etc. The best time for gathering the bark is in the spring, when it contains the most tannic acid.

Quercin, a white or yellowish crystalline solid, obtained from the European Oak bark, *Quercus Robur*, by Gerber (*Chem. Gaz.*, *I.*, 509), is a neutral bitter principle, dissolved by water and alcohol, but not by ether, strong alcohol, and spirits of turpentine. Its solution is precipitated by salts of lead, silver, tin, and protoxide of mercury. It may be obtained by placing the bark in one hundred parts of water to which one part of sulphuric acid has been added, and heating it to 212° F. To the decoction thus made, add lime suspended in lime-water, which separates the sulphuric acid, forming with it a precipitate of sulphate of lime. Afterward add carbonate of potassa, in solution, until a white deposit is no longer furnished, then filter, concentrate the filtrate to the consistence of flour paste, treat it with alcohol, and concentrate the alcoholic fluid by evaporation.

On cooling crystals are formed, which may be purified by repeated solutions and evaporations, as before.

Black Oak is likewise a forest tree common to the United States, the bark of which is much used in tanning, and for dyeing. It has a strong odor, a very bitter, styptic taste, and when masticated imparts a yellow tinge to the saliva. It is seldom employed internally on account of its disposition to derange the bowels, but is valuable as an external astringent. A yellowish-brown coloring substance is obtained from the bark by macerating it in boiling water, the color of which is improved by acids or alkalies. The dye-stuff called *quercitron* is the inner bark of this tree, which is much used in Europe for dyeing yellow. Chevreul obtained the coloring principle which he named *quercitron;* it has since been named *quercitric acid* on account of its forming salts with bases. It may be obtained by slowly concentrating an infusion or decoction of quercitron bark; a crystalline matter is deposited, which has a pearly luster while suspended in the liquid. Or, exhaust the bark with alcohol, separate the tannic acid by a moistened bladder, remove the alcohol by distillation, add alcohol to dissolve the crystalline matter left, and remove the coloring principle by water, filter, and evaporate. It may be purified by redissolving in alcohol, and re-crystallizing. It is in minute crystalline plates or scales, sulphur-yellow, inodorous, slightly bitter, soluble in 400 parts boiling water, in four or five parts of absolute alcohol, and slightly soluble in ether. Quercitric acid has been obtained in white needle-shaped crystals, which become yellow on exposure to the air. Black-Oak bark contains more tannic and gallic acids than the other officinal species.

Red Oak is more common in the Northern States and Canada; its wood is reddish and coarse grained, and used principally for fuel; its bark is extensively used in tanning. It contains considerable tannin, and is generally employed as an external agent. An extract of the bark, as well as the potash obtained from its ashes, are both much employed as a local application in the treatment of cancer, indolent ulcers, etc.

Properties and Uses.—Oak bark is slightly tonic, powerfully astringent, and antiseptic. It is useful internally in chronic diarrhea, chronic mucous discharges, passive hemorrhages, and wherever an internal astringent is required. In colliquative sweats, the decoction is usually combined with lime-water. It is, however, more generally used in decoction, as an external agent, which forms an excellent gargle for relaxed uvula and sore-throat, a good stimulating astringent lotion for ulcers with spongy granulations, and an astringent injection for leucorrhea, prolapsus ani, hemorrhoids, etc. The ground bark made into a poultice has proved useful in gangrenous or mortified conditions. In sickly, debilitated children, and in severe diarrheas, especially when the result of fevers, the decoction given internally, and used as a bath to the body and limbs, two or three times a day, will be found very efficacious. When given for diarrhea or dysentery, it should be combined with aromatics, and sometimes with castor-oil. A bath is often advantageous in some cutaneous diseases. The green bark of elder and white Oak, bruised together, or in strong decoction, forms a very useful and valuable application to abrasions. Dose of the decoction, one or two fluidounces; of the extract, from five to twenty grains. A coffee made from roasted acorns, has been highly recommended in the treatment of scrofula.

Off. Prep.—Decoctum Quercûs Albæ.

QUERCUS INFECTORIA.

Dyer's Oak.

Nat. Ord.—Cupuliferæ, *Richard;* Corylaceæ, *Lindley;* Amentaceæ, *Jussieu.* *Sex. Syst.*—Monœcia Polyandria.

MORBID EXCRESCENCES—GALLS.

Description.—Quercus Infectoria is a small shrub, or tree, from four to six feet in height. *Stems* crooked; *leaves* on short petioles, an inch to an inch and a half long, oblong, with a few coarse mucronate teeth on each side, bluntly mucronate, rounded and rather unequal at the base, smooth, bright-green, shining on the upper side. *Acorns* solitary, long, obtuse; *cup* scaly, hemispherical.—*L.*

History.—Dyer's Oak, or Gall Oak, grows from the Bosphorus to Syria, and from the Archipelago to the frontiers of Persia. It furnishes the *Gall-nuts,* or *Galls* of commerce. These are produced by the puncture of the foliaceous or cortical parts of the tree by an insect, for the deposition of its eggs. The insect producing the Galls of commerce is the *Cynips quercusfolii* of Linnæus, or the *Diplolepsis gallæ tinctoræ* of Geoffroy (*Ed.*). After the female insect has made a puncture, she deposits her eggs therein; in consequence of the irritation thus caused, an excrescence is soon formed, from the concretion of the morbid secretion which subsequently ensues, and which is called Galls. The larva of the insect is soon developed from the egg, changing first into the pupa and then into the imago. Toward the end of July, the young insect, having passed through all its stages of transformation into the state of fly, perforates its prison and escapes. The best Galls are those which are gathered about the middle of July, just before the escape of the insect. These are bluish-black, heavy, not yet perforated, and constitute the commercial *black, blue* or *green Galls.* Those Galls from which the insect has escaped are commonly larger, lighter colored, perforated, and less astringent; they are called *white Galls.—P.—Ed.*

Galls are chiefly imported from Syria and Turkey, though they have been brought from several other places in small quantity. The best kind were formerly called Aleppo Galls, from a supposition that they were obtained principally in the neighborhood of that town; but, at present, it is difficult to distinguish the finer sorts from various places, from each other. Galls vary in size from four to ten or twelve lines in diameter;

they are roundish, tuberculated on the surface, and hollow within. The best are of middle size, of a dark grayish-green or dirty pale-bluish color, of considerable weight and hardness, a somewhat shining surface, and a close, firm, resinous-like texture, but easily reduced to a pale yellowish-gray powder. The hollow in the center is small, and contains sometimes only dust and debris, in consequence of the insect having perished, but more commonly the insect itself in the state of larva, pupa, or most generally of fly, which is occasionally seen to have partly perforated the parietes of the excrescence. Both kinds have an intensely astringent taste, and are inodorous.—*Christison.* Water is the best solvent of Galls, and proof-spirit the next; pure alcohol or ether acts more feebly upon them. The chemical reactions of Galls in decoction or tincture, are similar to those named for tannic acid, as they chiefly depend upon the presence of this acid. Galls consist of a large proportion of tannic acid; according to Davy 100 parts gave 37 of matter soluble in water, of which 26 were tannic acid, 6.2 gallic acid with a little extractive, 2.4 mucilage and insoluble matter, and 2.4 carbonate of lime and saline matter. Pelouze found 40 parts of tannic acid, 3.5 gallic acid, 50 ellagic acid, and insoluble matter, and 6.5 extractive coloring matter; the last two named acids he considers as being produced only by the action of the oxygen of the air upon the tannic acid of the Galls.—*P.*—*Jour. de Pharm. XX.*, 359.

I have in my possession a specimen of an excrescence found on a plant, the name of which has not been ascertained, growing in Texas, in the neighborhood of Red River. It was presented to me by Mr. W. S. Merrell; he obtained it from a physician who had pursued the practice of his profession in that section of country, and who states that it is caused by the puncture of some insect, and is found in abundance. According to his account these morbid growths are hollow, globose, and whitish. The dried specimens which I have are of a light brown color mixed with fragments of a darker color, and appear to be pieces of a hollow body, some of which very much resemble squill in color. They are half a line and less in thickness, of various sizes, from a line to three-fourths of an inch in diameter, irregular in their shape, having an external convex surface which is very finely corrugated, and of a shining, resinous appearance under the microscope, and an internal concave surface which is much smoother than the external one, and in which may be distinctly traced veins running in various directions. They are translucent, with the exception of the darkest colored, have a short fracture, presenting under the microscope a shining, finely granulated, waxy or resinous surface, are inodorous, brittle, of a taste at first resembling green tea, but which becomes slightly bitter and powerfully astringent; the light-colored pieces are more astringent and bitter than the dark ones. One piece of this article, about one quarter of an inch in diameter, was placed in an ounce of water and agitated for a few minutes, and was not dissolved; to this about five or six grains of sulphate of iron were then added, which, on agitation, immediately turned the liquid black. This, used as an ink, formed pale lines scarcely discernible, but which, in a few minutes, became intensely black. I consider this the most powerful astringent vegetable product ever yet found in a natural state, and trust that means may be devised to introduce it into our markets.

Properties and Uses.—Galls are astringent, and may be used in all cases where astringents are indicated, as in chronic dysentery, diarrhea, passive hemorrhages, and in cases of poisoning by strychnia, veratria, and other vegetable alkaloids, with which it forms a tannate possessing less activity than the other salts of these bases. Boiled in milk they are good for the diarrhea of children. As a local application, the infusion is employed as an injection in gleet, leucorrhea, prolapsus ani, or for a gargle in indolent ulceration of the fauces, relaxed uvula, and the chronic stage of mercurial action on the mouth; the addition of alum is said to render it more beneficial. Dose of the powder, from five to twenty grains; of the tincture half a fluidrachm to a fluidrachm; of the infusion from half a fluidounce to a fluidounce.

Off. Prep.—Acidum Tannicum; Decoctum Gallæ.

RANUNCULUS BULBOSUS.

Crowfoot.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE CORMUS AND HERB.

Description.—Ranunculus Bulbosus has a perennial, solid, fleshy, roundish, depressed *cormus* or *root*, sending out radicles from its under side; in autumn it gives off lateral bulbs near its top, which afford plants for the following year, while the old cormus decays. The root sends up annually, several erect, round, hairy, and branching *stems*, from six to eighteen inches in height, and which are furrowed, hollow, and bulbous at base. The *radical leaves* are on long petioles, ternate, sometimes quinate; the segments variously cut, lobed and toothed, hairy. The *cauline leaves* are sessile and ternate, the upper ones more simple. Each stem supports several solitary, golden-yellow *flowers*, upon furrowed, angular and hairy *peduncles*. The *sepals* are oblong, hairy, and reflexed against the peduncle. The *petals* are five, inversely cordate, longer than the sepals, and arranged so as to represent the shape of a small cup. At the inside of the claw of each petal is a small cavity, which is covered with a minute wedge-shaped emarginate scale. The *stamens* are numerous, yellow, with oblong, erect *anthers*. *Ovaries* numerous, with reflexed *stigmas*. *Receptacles* spherical. *Carpels* acute, naked, diverging, tipped with very short recurved beaks.—*L.*—*G.*—*W.*

History.—This plant is common to Europe and the United States, growing in fields and pastures, and flowering in May, June, and July. There are several species, possessing similar properties, and designated by the general name of *Buttercup;* among these the *R. Acris*, *R. Repens*, *R. Sceleratus*, and *R. Flammula*, may be indifferently substituted, the one for the other. The leaves and unripe germens of these species are acrid, occasioning, when chewed, a singular, intense cutting sensation in the point of the tongue, which quickly ceases when the plant is spit out. This acrid principle is either very volatile, or readily undergoes decomposition, as it is entirely lost by drying, however carefully this process be managed; and it also disappears in the germens as the seeds, which are themselves bland, ripen. It, however, passes over in distillation, and may be preserved in the distilled water for a considerable time.—*Christison.* When any part of these plants is chewed, it occasions much pain, inflammation, and sometimes excoriation of the several parts of the mouth, and much heat and pain in the stomach, if it be taken internally. The distilled water of *R. Flammula* is said to act as an instantaneous emetic.

Properties and Uses.—These plants are too acrid to use internally, especially when fresh; but when applied externally, are powerfully rubefacient and epispastic. The *R. Bulbosus* is the officinal plant. It is employed, in its recent state, in rheumatic, neuralgic, and other diseases where vesication and counter-irritation are indicated. Its action, however, is so uncertain, and sometimes so violent, causing very obstinate ulcers, that it is seldom used. It is sometimes used by the beggars of Europe to produce and keep open sores, for the purpose of exciting sympathy. I have cured two obstinate cases of nursing sore-mouth, with an infusion made by adding two drachms of the recent root, cut into small pieces, to one pint of hot water; when cold, a tablespoonful was given three or four times a day, and the mouth frequently washed with a much stronger infusion.

RESINA.

Resin, or Rosin.

History.—*Resin* is a term applied to a great variety of vegetable products, of allied properties. But in medicine and pharmacy it is specially applied to the substance left by the pine turpentines, after the removal of their volatile oil by distillation. *Resina Flava*, or Yellow Rosin, contains some moisture, in consequence of the distillation not being carried to dryness; if this, while in a melted state, be shaken with water, it forms a lighter colored resin, termed *Resina Alba*, or White Resin. Black Rosin, Fiddlers' Rosin, or Colophony, is a translucent, brownish-yellow substance, the result of a distillation continued until all water is expelled, or without the use of water. If melted Rosin be run into cold water, contained in shallow tanks, and a supply of cold water be kept up until the Rosin has solidified, a pale-yellow product is obtained, called *Flockton's Patent Rosin.* Rosin is translucent, yellowish, brittle, pulverizable, rather heavier than water, of a feeble terebinthine odor and taste, fusible at a moderate heat, inflammable, soluble in ether and many volatile oils, insoluble in water, partially soluble in boiling rectified spirit, and capable of uniting by fusion with wax, fixed oils, fats, and spermaceti. The concentrated acids dissolve it, especially with the aid of heat; sulphuric or nitric acids slowly convert it into *artificial tannin.* Solutions of potassa and soda partially dissolve it, forming soluble soaps, and leaving a resinous principle undissolved. Prof. Olmstead states, that Rosin added to lard, gives it a degree of fluidity not before possessed by the lard, and also prevents the latter forming those acids which corrode metals. If three parts of lard have one part of finely powdered Rosin added, and the mixture be well stirred, without the application of heat, it softens, and so nearly approaches a fluid as to run freely when taken up on the stirring-rod, at a temperature of 72°. On melting the mixture, and setting it aside to cool, the following changes take place: At 90° it remains transparent and limpid; at 87°, a pellicle begins to form on the surface, and soon after it begins to grow slightly viscid, and as the temperature descends, it passes through different degrees of viscidity, until at 76° it becomes a dense semifluid. A compound of one part of Rosin to four of lard, may be used for various purposes: by adding a portion of black-lead, and applying a thin coating to iron stoves and grates, it prevents them from rusting, forming a complete protection. It may likewise be applied to various other purposes. By distillation Rosin yields rosin-oil and tar; the first is composed of four carburets of hydrogen, viz: retinaphte $C_{14} H_8$; retinyle $C_{10} H_{12}$; retinole $C_{32} H_{16}$, and metanaphthaline $C_{20} H_8$. This oil has been used for several purposes in the arts. Rosin is a compound or mixture of pinic acid, chiefly, with a variable amount of colophonic acid, a small quantity of sylvic acid, and traces of an indifferent resin soluble in cold alcohol, oil of petroleum, and oil of turpentine; it forms with magnesia a compound readily soluble in water. Pinic and sylvic acids are isomeric, their equivalent is expressed by the formula $C_{40} H_{29} O_3 HO$; and their salts by the formula $MO\ C_{40} H_{29} O_3$.—*P.*—*T.*—*Gregory.*

Properties and Uses.—Rosin is seldom given internally. Its principal use is to form plasters and ointments, to which it is an excitant ingredient, and renders them more adhesive. The vapor from Rosin has been inhaled in chronic bronchitis, and affections of the lungs with benefit; and the fumes of burning Rosin, if received upon the parts, will, it is said, remove the irritation attending piles and prolapsus ani. Half a drachm of powdered Rosin dissolved in a sufficient quantity of chloroform, so as to make a thick solution, will relieve neuralgia of the teeth, or toothache, by introducing a piece of cotton, which has been impregnated with the solution, into the hollow teeth.

Off. Prep.—Ceratum Resinæ; Ceratum Sabinæ; Emplastrum Calefaciens; Emplastrum Plumbi Oxidi Rubrum; Emplastrum Resinæ; Emplastrum Resinæ Compositum.

RHAMNUS CATHARTICUS.

Buckthorn.

Nat. Ord.—Rhamnaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE BERRIES OR FRUIT.

Description.—Buckthorn is a shrub from six to fifteen feet in height. The *branches* are alternate, or nearly opposite, spreading, straight, round, smooth, hard, and rigid, each terminating in a strong spine, after the first year. The *leaves* are from one to two inches long, and about two-thirds as wide, deciduous, bright-green, smooth, simple, ribbed; the young ones downy; the earlier ones in tufts from the flowering buds; the rest opposite, on the young branches. *Petioles* downy. *Stipules* linear. *Flowers* yellowish-green, on the last year's branches, numerous; the fertile ones with narrow petals, rudiments of stamens, and a deeply four-cleft style; barren ones with an abortive ovary and broader petals. *Berries* globular, bluish-black, nauseous, with four cells, and as many elliptical, plano-convex seeds.—*L.*

History.—Buckthorn is indigenous to Europe, and has been observed in this country as an introduced plant; it flowers from April to July, and matures its fruit about the middle of autumn. The parts used are the berries; they are globular, three or four lines in diameter, slightly compressed at the apex, black, glossy, and inclosing a green juice in which the seeds are imbedded, and which is entirely different from chlorophyll. The juice, which becomes gradually red, owing to the development of acetic acid in it, may be preserved long unchanged in the form of a syrup. It is soluble in water. When evaporated to dryness with alum, or lime and gum arabic, it forms the color called *sap-green.* Carbonate of soda and caustic potash change the solution of sap-green to yellow. Hence paper tinged with sap-green is a sensible test of alkalies. Sulphuric, nitric, and muriatic acids make it red. Carbonate of lime, added to a reddened solution, restores the green color. Hubert found in it acetic and malic acids, green coloring matter, brown gummy matter, sugar, and a bitter, cathartic principle.

The N. Y. Jour. Pharmacy, April, 1853, gives the following from *Jul. Ruthardt*, *Pharmaceut.*, relative to *Cathartin* obtained from Buckthorn berries, by F. L. Winkler. Fifteen pounds of the green berries, collected in September, were bruised and expressed. The dark, violet-colored, bitter juice, evaporated in a water-bath, formed a dark-brown syrup. This was exhausted several times by boiling hot, absolute alcohol until the latter had a slightly bitter taste. The united tinctures became turbid after cooling; they were then filtered and mixed with four times as much ether. A large quantity of slightly bitter, dark-colored, extractive matter separated, containing no sugar. The filtered solution of cathartin in ether and alcohol was distilled in a water-bath, the cathartin remaining with the coloring matter, then treated again in the same way, and two and a half ounces of pure cathartin were obtained. The residuum of the expressed berries was boiled with six or eight times its weight of water, set aside for several days, and a good quantity of impure *Rhamnin* was obtained, which was purified by washing with water, drying, dissolving in alcohol, decolorizing by animal charcoal, and separating by water. The ripe berries yielded cathartin, but no rhamnin.

Cathartin is a pale-yellow powder, soluble in water and spirits, insoluble in pure ether, has an aloe-bitter taste, is neutral, changes to a dark-brownish green by deuto-chloride of iron, gold-yellow by subacetate of lead and the alkaloids, fuses by heat, is decomposed at a high temperature, yields picrinic acid when acted on by nitric acid, and in the dose of one or two grains, purges without griping or unpleasant symptoms.

Properties and Uses.—Buckthorn berries (*Rhamni Baccæ*) are powerfully cathartic; twenty of the recent berries cause brisk watery purging, with nausea, dryness of the throat, thirst, and tormina. These effects are partly removed by giving the juice (*Rhamni Succus*) in the form of syrup, and which formerly enjoyed much reputation as a hydragogue in gout, rheumatism, and dropsy; at present, it is seldom employed in practice, and is occasionally employed as an adjunct to other cathartic and diuretic mixtures. Dose of the syrup, from half a fluidounce to a fluidounce.

RHEUM PALMATUM.

Rhubarb.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Enneandria Trigynia.

ROOT.

Description.—In relation to the Rhubarb root, the scientific world is in much ignorance, not knowing the exact plant or plants from which it is produced. That it is the root of a Rheum is generally acknowledged, but the peculiar species is yet undetermined. The plants from which the medicinal drug is obtained chiefly inhabit Chinese Tartary, growing wild on the highlands and mountains of that section of the globe. Christison says it is probable that the best qualities of commercial Rhubarb are produced five or six hundred miles north of the British Territories of Assam, in the very heart of Thibet, about 95° east longitude and 35° north latitude, near the sources of the great Hoang-ho River, and chiefly in the province of Gansun; a district with which no express communication has yet been held by any good European authority. The Rhubarb trade is closely guarded by those engaged in it, which has prevented naturalists from correctly determining its true source. Calau, an apothecary in the Rhubarb factory, at Kiachta, says:

"All that we know of the Rhubarb-plant or its origin is defective and wrong; every sacrifice to obtain a true plant or the seed has been in vain;

nor has the author been enabled to obtain it. A severe prohibition from the Chinese Government prevents all possibility of eliciting the truth."

It may be proper, however, to enumerate the several species to which Rhubarb of one kind or another has been referred. Some of these are cultivated in this country and Europe, and the stalks of the leaves, when stewed, have an agreeable acidity, on which account they are extensively used for pies, etc. Dr. Lindley, in his Flora Medica, pp. 354–59, gives the following description of the plants known to furnish a purgative Rhubarb:

"*Rheum Emodi*, Wallich; *Rheum Australe*, Don.—*Stems* six to ten feet high, much branched and sulcated, very thick below, gradually attenuated upward into large panicles, and these rough, with minute warts or excrescences; the color yellow-green, streaked with red-brown. *Leaves* very large, cordate, acute, dull-green, but little wavy, flattish, very much wrinkled, distinctly rough, with coarse short hairs on each side; sinus of the base distinctly open, not wedge-shaped, but diverging at an obtuse angle, with the lobes nearly turned upward. *Petioles* very rough, rounded-angular, furrowed; with the upper side depressed, bordered by an elevated edge, and very much narrower at the upper than the lower end. *Panicles* or rather compound racemes terminal, very long, the branches erect, virgate, rough. *Pedicels* solitary or clustered, somewhat verticillate, short, spreading in fruit, deflexed. *Flowers* very small, of a deep blood-red color. *Calyx* of six, spreading, ovate, deep segments, three alternate ones smaller. *Stamens* nine, shorter than the perianth. *Filaments* subulate, monadelphous at the base. *Ovary* short, triquetrous, often abortive; *styles* three, spreading. *Stigmas* large, warty. *Fruit* pendent, dark, blood-colored, shining, cordate, triangular, the angles sharply-winged, covered at the base with the persistent perianth, of which the three smaller segments are applied to the three winged angles. *Seed* ovato-triquetrous. This plant inhabits the mountains of Gossain Than, Kamaon. Don at one time stated that this was the undoubted origin of the Russian and Turkey Rhubarbs, but Pereira found that the specimens had hardly any resemblance to the Rhubarb of the shops. It is nearly equal in efficacy to the best Turkey drug.

Rheum Webbianum, Royle.—*Root leaves* large, long-stalked, cordate, acute, cauline-obtuse, rather downy above, veiny beneath and margin hairy; *petioles* rounded. *Upper branches* and *peduncles* round, smooth, slightly striated. *Axillary racemes* clustered, terminal, panicled; *pedicels* in threes, twice as short as the ripe fruit. *Sepals* entire, broadly oval, obtuse. *Achenium* somewhat cordate at base, entire or a little emarginate at the point. Inhabits Niti and Gossain Than, and resembles the preceding in its properties.

Rheum Spiciforme, Royle.—*Leaves* thick, leathery, cordate, blunt, red and netted beneath, and covered with stellate down on each side; *petioles* and *peduncles* smooth. *Racemes* arising from the very root, spicate. *Ped-*

icels numerous, clustered, as long as the ripe fruit. Inhabits the northern face of the Himalayas, at the Kherang pass, and several places beyond. Supposed to furnish an excellent Rhubarb.

Rheum Palmatum, Linnæus.—*Leaves* roundish-cordate, half palmate; the *lobes* pinnatifid, acuminate, deep dull-green, not wavy, but uneven and very much wrinkled on the upper side, hardly scabrous at the edge, minutely downy on the under side; *sinus* completely closed, the lobes of the leaf standing forward beyond it. *Petiole* pale green, marked with short purple lines, terete, obscurely channeled quite at the upper end. *Flowering stems* taller than those of any other species. Inhabits the country about the great wall of China. About the year 1750, a Tartarian dealer in Rhubarb gave what were said to be the seeds of genuine Rhubarb to Kauw Boerhaave, first physician to the Emperor of Russia; these seeds produced both *R. Palmatum* and *R. Undulatum.* M. Guibourt declares that of all the cultivated kinds *R. Palmatum* alone resembles exactly, in its odor and smell, the Rhubarb of China; and that it is the source of the true officinal Rhubarb is an opinion generally entertained.

Rheum Undulatum, Linnæus.—*Leaves* oval, obtuse, extremely wavy, deep green, with veins purple at the base, often shorter than the petiole, distinctly and copiously downy on each side, looking as if frosted when young, scabrous at the edge; *sinus* open, wedge-shaped, with the lower lobes of the leaves turned upward. *Petiole* downy, blood-red, semicylindrical, with elevated edges to the upper side, which is narrower at the upper than the lower end. This plant is cultivated in France, and forms a part of the French Rhubarb. At one time it was cultivated by the Russian government, from a supposition that it was the true officinal plant. See the preceding species.

Rheum Compactum, Linnæus.—*Leaves* heart-shaped, obtuse, very wavy, deep green, of a thick texture, scabrous at the margin, quite smooth on both sides, glossy and even on the upper side; *sinus* nearly closed by the parenchyma. *Petiole* green, hardly tinged with red, except at the base, semicylindrical, a little compressed at the sides, with the upper side broad, flat, bordered by elevated edges, and of equal breadth at each end. Inhabits Tartary and China, but yields an inferior Rhubarb. The petioles are used for pies.

Rheum Rhaponticum, Linnæus.—*Leaves* roundish-ovate, cordate, obtuse, pale-green, but little wavy, very concave, even, very slightly downy on the under side, especially near the edge, and on the edge itself, scabrous at the margin; *sinus* quite open, large, and cuneate. *Petiole* depressed, channeled on the upper side, with the edges regularly rounded off, pale-green, striated, scarcely scabrous. *Panicles* very compact and short, always rounded at the ends, and never lax as in the other garden species. *Flowering stem* about three feet high. Inhabits the borders of the Euxine Sea; more abundantly north of the Caspian, in the deserts between the Volga and the Yaik; also on the mountains of Krasnojar in Siberia.

This has a more disagreeable smell than Rhubarb, and is not gritty to the taste. It is cultivated in this country and Europe, for pies, etc. The prepared root has the resemblance of true Rhubarb, but not its medicinal properties.

Beside these, Lindley describes the *R. Moorcroftianum*, *R. Leucorhizum*, *R. Caspicum*, and *R. Crassinervum*, all of which yield roots more or less resembling the officinal, both in appearance and virtues.

According to Pereira, "the method of curing or preparing Asiatic Rhubarb for the market varies somewhat in different localities. In China it is as follows: The roots are dug up, cleansed, cut in pieces, and dried on stone tables, heated beneath by a fire. During the process, the roots are frequently turned. They are afterward pierced, strung upon cords, and further dried in the sun. In Tartary the Moguls cut the roots in small pieces, in order that they may dry the more readily, and make a hole in the middle of every piece, through which a cord is drawn, in order to suspend them in any convenient place. They hang them, for the most part, about their tents, and sometimes on the horns of their sheep. Sievers, however, states that the roots are cut in pieces, strung upon threads, and dried under sheds, so as to exclude the solar rays; he also tells us that sometimes a year elapses from the time of their collection until they are ready for exportation."

History.—There are several varieties of Rhubarb met with in commerce, termed the *Russian*, *Chinese*, *English*, and *French* Rhubarb, among which the Russian is considered the best. RUSSIAN RHUBARB was formerly obtained by way of Natolia, a Turkish port, and in consequence received the name of *Turkey Rhubarb;* it has also been called by the several names of *Persian*, *Moscow*, *Bucharian*, or *Siberian Rhubarb*. It is prepared in Tartary and furnished to the Russian government by a few Bucharian families, who obtain it for this purpose under an express contract; at the Siberian town of Kiachta, the Rhubarb undergoes its first examination by an apothecary commissioned for that purpose by the government of Russia, who carefully examines it, rejecting and burning all Rhubarb which does not possess the properties required. The selected article is forwarded to St. Petersburg, where it is again sorted and shipped for other countries. It is in irregular, roundish-cylindrical, or flat, plano-convex pieces, usually from one to three inches in breadth, always obscurely angular, owing to the root-bark, as well as a small portion of the substance immediately beneath the bark, having been apparently sliced off with a knife, and often perforated with a hole, by which they had been strung up to dry, or made, perhaps, to ascertain the quality of the roots at their first examination. Their external surface is yellow, and thinly covered with a yellow powder, caused probably by the friction or rubbing together of the pieces; and when scratched with a knife, they give a bright yellow streak. They have rather a compact texture, an uneven fracture exposing a surface beautifully marbled with irregular, waving, grayish and reddish veins. They are easily pulverizable, giving a bright yellow powder. Russian Rhubarb has a peculiar, aromatic, bitter, faintly astringent taste, and a strong, peculiar odor; it tinges the saliva yellow, and produces a crackling, or sense of grittiness between the teeth, owing to crystals of oxalate of lime, which are largely contained in it.—*Christison.* By boiling very thin slices of the root in water, and then submitting them to the microscope, we observe cellular tissue, annular ducts, and numerous *conglomerate raphides* (masses of oxalate of lime crystals). From 100 grains of Russian Rhubarb, the late Mr. E. Quekett procured between thirty-five and forty grains of these raphides. They are in the interior of the cells of the root, and are also found in English Rhubarb. —*P.*

The CHINESE or EAST-INDIAN RHUBARB is brought from Canton; the finest quality of it, termed *Batavian* or *Dutch-trimmed Rhubarb*, very much resembles the Russian Rhubarb in appearance. That which is brought to this country, however, as Chinese Rhubarb, consists of irregular pieces, which are never angular like Russian Rhubarb, but smoothly rounded at the edges, as if the bark had been removed by rasping or scraping. Their outer surface is of a rather duller yellow color than the Russian drug, their density is somewhat greater, and their texture more compact; but the appearance of a fresh fracture is very nearly the same. They are usually perforated, and the holes frequently contain fragments of cord by which they were suspended during desiccation. They are not of such uniform quality as the Russian article, being often imperfectly stripped of their bark, and more or less attacked by insects, moldiness, or other impurity. The color, odor, taste and grittiness are very nearly, if not precisely the same as those of the Russian drug. Their powder is yellow, with a tawny tinge, but in the finer kind it is hardly discernible from the powder of Russian Rhubarb. The major portion of the Rhubarb consumed in this country is the Chinese variety; it is somewhat inferior to the Russian, but is less expensive, and when of good quality is sufficiently active to answer all medical purposes.

EUROPEAN RHUBARB is that which is prepared in several parts of Europe, but principally in England and France. The English variety is prepared in various parts of England, but chiefly near Banbury, in Oxfordshire, where twenty tons are produced annually from the roots of *Rheum Rhaponticum* alone. It is gathered in October and November, from plants three years old. The roots are freed from dirt, deprived of their outer coat by a sharp knife, exposed to the sun and air for a few days, and dried on basket work in drying-houses heated by stove-pipes or brick-flues. The curing process is accelerated by scooping a hole in the largest pieces. It occurs in various sized and shaped pieces, which are trimmed and frequently perforated, some are flat, and other pieces, again, segments of cylinders. It has an external reddish hue, and brownish spots of adhering bark, and internally a looser, softer, and more spongy texture than the others, with occasional cavities, especially in the center. It is more easily scratched with the nail, and yields a lighter yellow streak; and the surface of a fresh fracture shows the same marbled red and gray lines, but generally more straightly radiated from the center. In taste and odor it resembles the eastern Rhubarbs, being more mucilaginous, and less gritty, and of a weaker and more disagreeable smell. The long or inferior pieces, called *Stick English Rhubarb*, are prepared from the root-branches. These descriptions of Rhubarb contain, usually, very few oxalate of lime crystals. They are principally used for adulterating the powder of true Eastern Rhubarb.

FRENCH, or RHAPONTIC RHUBARB, is made in abundance at an establishment called Rheumpole, near the port of L'Orient, from the roots of *Rheum Rhaponticum*, *R. Undulatum*, and especially *R. Compactum*. Some of it has been sold in this country as *Krimea Rhubarb*. It somewhat resembles the Chinese drug, but has neither its pleasant odor, nor aromatic taste and grittiness. Its properties are very similar to the English variety, and like that, it is often used to adulterate the powder of true Eastern Rhubarb.

A mere reference to other varieties of Rhubarb will be sufficient here. The *Himalaya* or *Emodi Rhubarb*, from the Rheum Australe, and other species growing in the Himalaya mountains, is brown, fibrous, inodorous, and inferior, yet is said to be nearly as active as the Chinese. The Russian traveler, Pallas, describes a *White or Imperial Rhubarb* as being a superior article, of white color, and sweetish taste; but according to Dr. G. Walpers, who has made some inquiries in relation to it, it proves to be one of those fabulous sayings, in which, unfortunately, some travelers are very apt to indulge.

In choosing Rhubarb, those roots only should be taken which are sound and hard, of a bright yellow color, of a strong Rhubarb-aromatic smell, of a bitterish, slightly astringent taste, without viscidity, which feel gritty under the teeth, and which communicate a bright yellow color to the saliva; they should present, when fractured, a marbled appearance of red and whitish veins, and be easily reduced to a bright yellow powder, sometimes tawny-tinged.—*Ed.*—*T.* Inferior Rhubarb is frequently colored with turmeric, which may be detected by solution of boracic acid, which turns turmeric-yellow to brown, but does not affect the yellow color of the true Rhubarb. When in powder, the adulterations of Rhubarb are very difficult, if at all possible, to detect. Water, either cold or boiling, extracts the active properties of Rhubarb; and if it be boiled in water till it becomes soft, and is then crushed and agitated in the water, pale gray sandy-like deposits of crystals of oxalate of lime in groups are seen to separate and subside. Continued boiling injures its virtues. The infusion prepared by percolation with cold water, is preferable to that obtained with boiling water alone, as this last becomes turbid on cooling, owing to a partial separation of some of the principles of the root; this may be prevented, however, by the addition of a little spirit. Proof-spirit is a more ready solvent of the active ingredients of Rhubarb than water. Nitric acid added to an infusion of Russian Rhubarb in twenty parts of water, causes a dense muddiness, and slowly a yellow precipitate, owing to the separation of rhabarbarin; tincture of iodine causes a tawny muddiness, probably for a similar reason; solution of potassa combines with the rhabarbarin and produces a fine blood-red color; and lime-water causes at first a pale cherry-red haze, which slowly gives place to a red precipitate composed of rhabarbarin and lime. Sesquichloride of iron produces a green precipitate, and solution of isinglass a yellow curdy deposit, owing to the presence of tannin. Chinese Rhubarb is affected in the same way by the above reagents. Rhubarb has been analyzed by several chemists, and with different results. In 1836 Brandes represented the Russian variety to contain 2 per cent. of pure rhabarbaric acid, 7.5 impure rhabarbaric acid, 2.5 gallic acid with some rhabarbaric, 9.0 tannic acid, 3.5 coloring extractive, 11.0 uncrystallizable sugar with tannic acid, 4.0 starch and pectic acid, 14.4 gummy extractive taken up by caustic potassa, 4.0 pectic acid, 1.1 malate and gallate of lime, 11.0 oxalate of lime, 1.5 sulphate of potassa and chloride of potassium, 0.5 phosphate of lime with oxide of iron, 1.0 silica, 25.0 woody fiber, 2.0 water.—*P.* The principles indicated by previous investigators, under the names *Rhein*, *Rheumin*, *Rhabarbarin*, and *Caphopicrite*, appear to be complex bodies, consisting of the *Rhabarbaric acid* of Brandes combined with other principles. It may be obtained by purifying the alcoholic extract of Rhubarb with cold water, drying the residue, dissolving it in the smallest possible bulk of spirit, and then adding ether so long as it separates any thing. The ether is then to be distilled off, and the residue again similarly treated with spirit and ether. The solution yields it pure by spontaneous evaporation. It is granular, yellow, tasteless and odorless, fusible, partially volatile, sparingly soluble in water, more so in alcohol or ether, and acid in its reactions. Alkaline solutions dissolve it forming intensely red solutions, from which acids separate it as a yellow precipitate, and which, with the earthy salts, give yellow precipitates of the principles, united with an earthy base. Ultimate analysis shows that it is identical with a coloring matter (chrysophanic acid) obtained by Rochleder from the yellow lichen *Parmelia Parietina.*

Schlossberger and Dœpping having analyzed Moscow and Chinese Rhubarb, in 1844, found,

1. A beautiful, clear, yellow, odorless, and tasteless substance, termed *chrysophanic acid;* it may be procured from the root by means of ether in a displacement apparatus; the crystals which are deposited from the solution, are purified by re-crystallization from alcohol. They are nearly insoluble in water and alcohol, more so in ether, with a reddish color. They sublime partly undecomposed. Chrysophanic acid forms a red substance

with warmed concentrated sulphuric or nitric acids, which is soluble in ammonia giving a violet color. It forms deep red solutions with alkalies. Its formula is $C_{10} H_8 O_3$.

2. Three resins; *a. Aporetin*, a black, shining body, slightly soluble in hot spirit, ether, cold and hot water, but very soluble in ammonia or potassa. *b. Phœretin*, $C_{16} H_8 O_7$, a yellowish-brown substance, very slightly soluble in water and ether; very soluble in spirit and alkalies, becoming splendid red with the last, from which it is precipitated by the mineral acids. *c. Erythroretin*, $C_{19} H_9 O_7$, a yellow substance, soluble in ether and alcohol, and forms purple combinations with potassa and ammonia, which are very soluble in water.—*P.* By an internal employment of Rhubarb, these substances enter the urine, which can be at once determined if the urine be rendered alkaline.

3. Bitter extractive; 4, tannic acid; 5, gallic acid; 6, sugar; 7, pectin; 8, oxalate of lime; 9, ashes containing potash, soda, silica and sand, iron, lime, magnesia, various acids, etc. The cathartic principle of Rhubarb has not yet been isolated, it is supposed to be of a volatile character.

Mr. H. S. Evans states that "when powdered or rasped Rhubarb is examined under the microscope by a power of from 300 to 400 diameters, a variety of structures are observed. In the first place, empty cells present themselves, frequently collapsed and in dense clusters, and chiefly abounding in the central portion of the root; others, apparently empty, are rounded or angular, with exceeding thin walls. Somewhat similar to these, but smaller, are rounded and angular cells, filled, or partially so, with starch grains, among which occasional fragments of a pale-yellow resinous matter are found. Others, again, similar in shape and size, are found entirely filled with this yellow resinous matter which is readily soluble in alcohol. Some very irregularly formed cells, with much thicker walls, abound, containing a dark reddish-brown matter of much less solubility than the paler resin. The starch grains contained in the cells are small, about $\frac{1}{3000}$ inch in diameter, and for the most part of a rounded form, with a central cruciate hilum, and, when treated with weak alcohol, concentric markings may be observed upon them. Numerous bundles of vascular tissue are also found, composed of small and uniformly reticulated ducts with irregularly pitted tissue, occasionally inclosing a spiral vessel. Besides these forms of tissue we also meet with peculiar platter-shaped vessels; they are perfectly round bodies, of a more or less yellow color, not acted upon by iodine, but, when treated with alcohol, disappear, leaving but a collapsed sac. They are probably, the receptacles of an oleo-resinous matter, to which the aroma of the root is owing. The crystals of oxalate of lime are found most abundantly in the central portion of the root, included in cells, and consist of large stellate groups. These are the general appearances of good Russian Rhubarb; in the other varieties they are modified according to the character of the drug." *Pharm. Jour. & Trans., XIII., p.* 309.

Mr. John S. Cobb gives the following test for distinguishing between the Russian, English, and Indian Rhubarbs. Take two fluidrachms of simple (proof) tincture, of the Lond. Pharm. strength, and treat it with one fluidrachm of equal parts of nitric acid and distilled water, in a test tube. The following result will take place: East-India Rhubarb soon becomes cloudy, and in from five to twenty minutes is turbid. Russian remains unchanged for three or four hours. English loses its brightness in half an hour; on holding it before a light a precipitate may be seen diffused through it. He supposes this to be owing to the oxidation of the active principle of the Rhubarb.—*Pharm. Jour.*, *XII.*, 374.

Rhubarb is *incompatible* with lime-water, sulphates of iron and zinc, concentrated acids, tartar-emetic, corrosive sublimate, and solutions of acetate of lead, nitrate of silver, gelatin, quinia, etc.

Properties and Uses.—Rhubarb is cathartic, astringent and tonic; as a cathartic, it acts by increasing the muscular action of the intestines, rather than by augmenting their secretions, and affects the whole intestinal canal, especially the duodenum. Its cathartic effect is succeeded by a mild astringency, which has gained for Rhubarb the reputation of being secondarily a calmative, as well as a stimulant of the digestive canal; with its astringent influence, it likewise exerts for the most part, a tonic action on the stomach, improving the appetite and digestive powers. It is absorbed in the course of its operation, making the serum of the blood yellow, the sweat tawny, and the urine red, which may be distinguished from bloody urine by heating it. If blood be present it will coagulate, and remove the red color, which will not happen if the tint be owing to Rhubarb. Rhubarb is much used as a laxative for infants, in many infantile diseases; its mildness and tonic qualities rendering it peculiarly applicable, especially when enfeebled digestion and irritation of the alimentary canal are present. In acute or chronic diarrhea or dysentery, in convalescence from exhausting diseases, and in some irritable habits where the mildest of all other laxatives are apt to excite hypercatharsis, Rhubarb is an appropriate medicine. Its combination with soap or an alkali tends to counteract its astringent effects, and it thus becomes valuable in cases of constipation. It is useful in all cases of fecal accumulations, as it produces fecal, more than watery discharges. Sometimes it produces griping, which may be obviated by aromatics. The following pill I have found very beneficial in dyspepsia attended with constipation, chronic diarrhea and dysentery, habitual constipation, hepatic derangements, piles, etc.—Take of extract of Rhubarb, leptandrin, hydrastin, and castile soap, of each, half a drachm, mix them well together, and divide into thirty pills; of these, one, two, three, or four may be taken daily, sufficient to keep the bowels regular, without causing catharsis. When more than one are required daily, they should be given in doses of one pill at a time at regular intervals through the day. Rhubarb is generally contra-indicated in severe febrile or inflammatory affections. Toasting dissipates its purgative property considerably, but without diminishing its astringency, and it is thus prepared, recommended by some practitioners in diarrhea, dysentery, cholera morbus, and other diseases where astringents are indicated.

Dose of the powder as a purgative, from ten to thirty grains; as a laxative, from five to ten grains; as a tonic, from one to five grains; of the tincture or syrup, one or two fluidrachms.

Off. Prep.—Extractum Rhei; Extractum Rhei Fluidum; Extractum Rhei et Potassæ Fluidum; Infusum Rhei; Pilulæ Leptandrini Compositæ; Pulvis Rhei Compositus; Tinctura Rhei.

RHODODENDRON CHRYSANTHUM.

Yellow Rhododendron.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE LEAVES.

Description.—This is a small bush, with the *stem* from a foot to a foot and a half high, spreading, very much branched, often almost hidden among moss, from which the tips only of its shoots are protruded. The *leaves* are alternate, of the texture of a laurel leaf, ovate, somewhat acute, tapering into the stalk, reticulated and very rough above, paler and smoother underneath. The *flowers* are large, showy, nodding, supported on clustered, terminal, loose peduncles, emerging from among large downy scales. The *corolla* is campanulate, five-cleft, with rounded segments, of which the three upper are rather the largest, and streaked with livid dots next the tube, the lower unspotted. *Stamens* ten, unequal, deflexed; *anthers* oblong, incumbent, without appendages, opening by two terminal pores. *Capsule* ovate, rather angular, five-celled, five-valved, septicidal; *seeds* numerous, minute.—*L.*

History.—Rhododendron is an elegant evergreen shrub, inhabiting the mountains of Siberia, with large, yellow flowers, which appear in June and July. The leaves are the parts used in medicine, and should be gathered as soon as the capsules have ripened. They have a faint odor when recent, which is lost by drying; their taste is somewhat bitter, slightly acrid, and astringent. Water or alcohol extracts their properties. Stolze procured from the dried leaves, oxidized extractive, soluble extractive, a modification of tannic acid, green wax-resin, extractive obtained by potassa, and woody fiber. Our native species, the *R. Maximum*, and *R. Punctatum*, according to Barton, possess properties similar to the *R. Chrysanthum*, but milder; according to Bigelow they are astringent, but not narcotic.

Properties and Uses.—Yellow Rhododendron contains a stimulant narcotic principle; for it increases the heat of the body, excites thirst, and produces diaphoresis, or an increased discharge of the other secretions or excretions, and which are generally followed by a decrease of action of the arterial system. With some persons it causes emeto-catharsis, inebriation, and delirium. The Siberians use a decoction of it in chronic rheumatism and gout. They put about two drachms of the dried shrub in an earthen pot, with about ten ounces of boiling water, keeping it near a boiling heat for a night, and this they take in the morning. Beside its other effects, it is said to produce a sensation of prickling or creeping in the painful parts; but in a few hours the pain and disagreeable symptoms are relieved, and two or three doses generally complete the cure. The use of liquids is not allowed during its operation, as this is apt to induce vomiting.—*Ed.*—*Coxe.* It is a valuable remedy, used in Russia, Germany, and sometimes in France and England, but not in this country.

RHUS GLABRUM.

Sumach.

Nat. Ord.—Anacardiaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK AND FRUIT.

Description.—Great care is necessary in the selection of the several species of Rhus, as many of them are highly poisonous. Rhus Glabrum, or *Smooth Sumach* is a shrub from six to fifteen feet high, consisting of many straggling, glabrous branches, covered with a pale-gray bark, having occasionally a reddish tint. The *leaves* are alternate, odd-pinnate, and consist of from six to fifteen leaflets, about three inches long and one-fourth as wide, lanceolate, acuminate, acutely serrate, smooth, shining, and green above, whitish beneath, sessile, except sometimes the terminal odd one; during the fall they become red. The *flowers* are greenish red, and arranged in terminal, thyrsoid, dense panicles. *Calyx* of three sepals united at base; *petals* five; *stamens* five, inserted into the edge or between the lobes of a flattened disk in the bottom of the calyx; *styles* three; *stigmas* capitate. *Fruit* a small red drupe, hanging in clusters, and when ripe covered with a crimson down, which is extremely sour to the taste, owing to the presence of malic acid in combination with lime.—*W.*—*G.*

History.—Rhus Glabrum, sometimes called *Upland or Pennsylvania Sumach*, is common to the United States and Canada, growing in thickets and waste grounds, and on rocky or barren soil, flowering in June and July, and maturing its fruit in September and October. The bark and drupes or berries are officinal; the latter should be gathered before the rains have removed their external downy efflorescence, for when this has been washed off, the berries are no longer acid. Sumach berries have an agreeably acid, slightly styptic taste, and which is due to their malic acid and tannic acid, beside which they contain malate of lime, gallic acid, extractive, fixed and volatile oils, red coloring matter, fiber, etc. When examined under the microscope, the silky down appears to be a mass of tubular hairs of a white color, enveloped in a crystalline coating of bimalate of lime, impregnated with red coloring matter, resembling an icicle in appearance; when still further matured this down is replaced by a moist crimson coating.—*Am. Jour. Pharm. XXV.*, 193. Sumach leaves have been used in tanning, and a concentrated decoction of the bark is used as a mordant for dyeing red colors.

Sumach-root bark is of a light gray color, with a tinge of red externally, yellowish-white internally, and of a very astringent and slightly sweet taste. When broken on the plant, a milky fluid exudes from the bark as well as from the leaves, which subsequently forms a solid, gum-like body. Both the bark of the branches and root are used. The bark of the root contains albumen, gum, starch, tannic and gallic acids, caoutchouc, soft resin, coloring matter, and probably a volatile odorous principle.—*Ibid.*

The excrescences which form upon the leaves are reddish-brown externally, grayish-white internally, varying in size and appearance, being usually very irregular in their outline, hollow, and sometimes consist of a mere shell, of a line or less in thickness. Their taste is slightly bitter, and very astringent. They contain tannic acid, gallic acid, albuminous and coloring matter, and are fully equal to galls in medicinal power.

A so-called chemical Institute of New York city profess to have obtained from the leaves of the Rhus Glabrum, the active principle of the plant, which they term *Rhusine.* It is said to be prepared by percolation with alcohol of specific gravity 0.830, and then displace the solvent by means of a vacuum apparatus. The rhusine is then precipitated and washed with distilled water, dried on filter-cloth, in an airy, dry room, and reduced to a fine powder.—(*See Eclectic Journal of Medicine, Rochester, Vol. IV., No. VI., page* 232.) It is said to be a light brown powder, soluble in hot water, insoluble in alcohol and having a slightly bitter taste. I have not been able to procure any of it, nor a more detailed account of its preparation. Both the bark and the berries of Sumach yield their active properties to water.

Properties and Uses.—Sumach bark is tonic, astringent and antiseptic; the berries are refrigerant and diuretic. In decoction or syrup, the bark of the root has been found valuable in gonorrhea, leucorrhea, diarrhea, dysentery, hectic fever and scrofula. Combined with the barks of slippery-elm and white pine, in decoction, and taken freely, it is said to have proved highly beneficial in syphilis. Externally, the bark of the root in powder, applied as a poultice to old ulcers, forms an excellent antiseptic; a decoction may also be used in injection for prolapsus uteri and ani, and leucorrhea, and as a wash in many cutaneous diseases; simmered in lard it is valuable in scald-head. A decoction of the inner bark of the root is serviceable in the sore-mouth resulting from mercurial salivation, and is much used internally in mercurial diseases. The *berries* may be used in infusion in diabetes, strangury, bowel-complaints, febrile diseases, etc., as a gargle in quinsy, and ulcerations of the mouth and throat; and as a wash for ringworms, tetters, offensive ulcers, etc. Excrescences are frequently formed on the leaves of this plant, and which are very astringent; when powdered and mixed with lard or linseed oil, they are said to prove useful in hemorrhoids. In hot weather, if the bark be punctured, a gummy substance flows out, which has been used with advantage in gleet, and several urinary difficulties. In gonorrhea, the following has been recommended: mix together one scruple, each, of this gummy substance from Sumach, and Canada balsam, form into a pill mass with a sufficient quantity of powdered pokeroot, and divide into ten pills, of which one or two may be taken three or four times daily. Dose of the decoction of Sumach bark, or infusion of the berries, from one to four fluidounces.

There are several varieties of this plant, as the *R. Typhinum*, Staghorn or Velvet Sumach; and the *R. Copallinum*, Mountain or Dwarf Sumach, which possess similar virtues, and which must be carefully distinguished from those which possess poisonous properties. The non-poisonous species have their fruit clothed with acid crimson hairs, and their panicles are compound, dense, and terminal; the poisonous varieties have axillary panicles, and smooth fruit.

Rhusine is said to be tonic, astringent, and antiseptic; and to be of service in diarrhea, dysentery, and bowel diseases generally, in doses of one to two grains, every two, three or four hours, to be given after the exciting cause of these diseases has been removed by other agents.

Off. Prep.—Decoctum Rhûs Glabri; Extractum Rhûs Fluidum.

RHUS TOXICODENDRON.

Poison Oak.

Nat. Ord.—Anacardiaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE LEAVES.

Description—There are three species of Rhus, common to this country, which are poisonous, viz.: the *Rhus Toxicodendron*, *Rhus Venenàta* and *Rhus Pumilum.* They possess similar medicinal virtues, in a greater or less degree, and should be known to every physician.

RHUS TOXICODENDRON, or *Poison Oak*, is a creeping shrub from one to three feet high, with long cord-like shoots, emitting strong lateral fibers; the stems are either erect or decumbent. The bark is brownish-gray. The *leaves* are ternate, on long semicylindrical petioles. The *leaflets* are broadly oval or rhomboidal, from two to six inches long, two-thirds as wide, petiolate, acuminate, smooth and shining above, slightly downy beneath, especially on the veins; the margin is sometimes entire, and sometimes variously toothed and lobed, in the same plant. The *flowers* are small, greenish-white, diœcious, and grow in axillary, subsessile, racemose panicles on the sides of the new shoots. The barren flowers have a *calyx* of five erect, acute segments, and a *corolla* of five oblong recurved petals; *stamens* erect with oblong anthers; in the center is a rudiment of a *style.* The *fertile flowers* are about half the size of the preceding, with *calyx* and *corolla* similar, but more erect. They have five small abortive *stamens*, and a roundish *ovary*, crowned by a short, erect *style* bearing three small, capitate stigmas. The *fruit* is a roundish, smooth, dry berry, of a pale-green color approaching to white, and which contains a solitary bony seed.—*L.*—*W.*—*G.*

Rhus Radicans or *Poison Ivy*, and sometimes called *Poison Vine*, is considered by botanists to be merely a variety of the above species; it has a climbing *stem* from three to twenty or more feet in length, and climbs trees, fences, and neighboring objects, to which it becomes attached by its myriads of radicating tendrils. The leaflets are quite entire, smooth and shining on each side, with the exception of the veins beneath. These plants grow throughout the United States and Canada along fence-rows, in thickets, etc., flowering from May to August. They yield an abundance of yellowish narcotic acrid milky juice, which becomes black when exposed to the air, and forms an indelible ink when applied to linen; it is soluble in ether. This juice, and even the exhalations from the plant are extremely poisonous to many persons, but not to all, producing a burning itching, redness and swelling of the parts, especially the face, succeeded by blisters, suppuration, aggravated swelling, heat, pain and fever; symptoms which though often highly distressing, are rarely fatal.—*L.*—*B.*—*W.*

The *Rhus Venenàta* or *Poison Sumach*, also known as *Poison-wood*, *Poison-ash*, and inappropriately as poison-elder, and poison dog-wood. This has been confounded with the *Rhus Vernix* of Linnæus, a species which grows in Japan. It is a shrub or small tree, from ten to twenty, and even thirty feet in height, with the trunk from one to five inches in diameter, branching at the top, and covered with a pale-grayish bark, which is reddish on the leafstalks and young shoots. The *leaves* are pinnate, with from three to six pairs of opposite *leaflets*, and an odd terminal one, which are oblong or oval, entire or slightly sinuated, acuminate, smooth, paler underneath, and nearly sessile, except the odd terminal one: they are about three inches long, and nearly half as wide. The *flowers* are diœcious and polygamous, very small, green, and in loose, axillary, pedunculate *panicles*. The panicles of the barren flowers are downy, the largest and most branched. *Sepals* five, ovate; *petals* five, oblong; *stamens* longer than the petals, and projecting through their interstices; the rudiment of a three-cleft style in the center. In the fertile flowers, the panicles are much smaller, sepals and petals resemble the last, while the center is occupied by an oval *ovary*, terminated by three circular *stigmas.* The *fruit* is a bunch of dry berries or drupes, about the size of peas, smooth, greenish-yellow or greenish-white, sometimes marked with slight purple veins, and becoming wrinkled when old; roundish, a little broadest at the upper end, and compressed, containing one white, hard, furrowed seed.—*L.*—*G.*—*W.*

Rhus Venenàta grows in low meadows and swamps from Canada to the

Gulf of Mexico, flowering from May to August. The milky juice which flows when the plant is wounded, is similar in its action to that of the preceding plant, and may, according to Bigelow, be made into a beautiful, shining, and permanent varnish, by boiling, very analogous to that obtained in Japan from the *Rhus Vernix.* It is much more poisonous than the previous species, and its volatile principle taints the air for some distance around with its pernicious influence, producing in many persons severe swellings of an erysipelatous nature; sometimes the body becomes greatly swollen, and the person unable to move. Some persons are hardly or nor at all affected even by handling it. The affection caused by it generally abates spontaneously after several days, and may be treated in the same manner as named for the poisonous effects of the R. Toxicodendron.

RHUS PUMILUM.—This is the most poisonous Rhus in this country. It is an extensively procumbent, villous-pubescent shrub, about a foot high, with pinnate *leaves; leaflets* about eleven, oval or oblong, slightly acuminate, coarsely toothed, with a velvety pubescence, the three upper leaflets often confluent, the terminal one when distinct attenuate at base. *Panicles* terminal, thyrsoid, nearly sessile; *drupes* covered with a red silky pubescence.—*T.*—*G.* It is confined to the South, and is found in North Carolina.

History.—The leaves of R. Toxicodendron are the only parts of the plant used, although the whole plant is highly active. When dried they have no odor, and an insipid taste with acridity. Water or alcohol extracts their properties. The best preparation for medical use is a saturated tincture of the recent leaves, and which should be kept well corked. I have seen no analysis of this plant. Tannic and gallic acids are said to be among its constituents. Pereira states "there are two substances in it worthy of investigation; viz.: a volatile acrid principle, and the substance which blackens by exposure to the air."

Properties and Uses.—The fresh juice of the Poison Oak is powerfully irritant. In some persons it produces vesication wherever it is applied, accompanied sometimes by much symptomatic fever,—and even the emanations from the plant are alleged to have the same effect on certain constitutions. To remove these effects, the parts may be bathed with a solution of borax or copperas, or a wash made by boiling the bark of the elder in buttermilk; accompanied with a light cooling regimen, and cooling purgatives or diuretics. The bruised leaves of the *Collinsonia Canadensis*, externally, and an infusion of the *Verbena Urticifolia*, internally, have been successfully used in internal or external poisoning by these plants. In large doses the leaves and juice are narcotico-irritant, and in small doses, they are diuretic, diaphoretic, laxative, and a stimulant of the nervous system. It is said they produce twitchings of paralyzed muscles, and prickings of the affected limb, similar to strychnia or nux vomica. They have been highly recommended in chronic paralysis, chronic rheumatism, cutaneous diseases, and some diseases of the eye; it is seldom used on account of its poisonous consequences and the volatility of its active principle. I have derived much advantage from the following preparation in paralysis, chronic rheumatism, and some obstinate cutaneous affections: Take of a saturated tincture of the fresh leaves of Rhus Toxicodendron half a fluidounce, saturated tincture of Aconitum, volatile tincture of Guaiacum, of each two fluidrachms; mix together. Of this give forty drops every three or four hours, having previously evacuated the bowels. Rhus Toxicodendron has been employed successfully in paraplegia without any actual organic lesion, likewise in paralysis of the bladder and of the rectum. Dose of the leaves, in powder, half a grain three times a day, gradually increased until some effect is produced; of the saturated tincture from five to ten drops. It has also proved efficacious in acute erysipelas.

Off. Prep.—Tinctura Rhûs Toxicodendri.

RIBES NIGRUM.

Black Currant.

Nat. Ord.—Grossulaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE FRUIT.

Description.—The Black Currant is a woody bush or shrub from three to five feet in height, *stems* unarmed, and the *leaves* from three to five lobed, punctate beneath, dentate-serrate, longer than their petioles. *Racemes* lax, hairy, somewhat nodding. *Calyx* campanulate, with reflexed segments; *petals* oblong, yellowish; *bracts* minute, subulate or blunt, nearly as long as the pedicels. *Fruit* large, roundish-ovoid, nearly black. —*W.*—*L.*

RIBES RUBRUM, or common *Red Currant*, has unarmed, straggling or reclined *stems*, with *leaves* obtusely three to five lobed, smooth above, pubescent beneath, subcordate at base, margin mucronately serrate. The *racemes* are from lateral buds distinct from the leaves, pendulous, and nearly glabrous. *Bracts* blunt, shorter than the pedicels. *Calyx* flattened out, short, spreading, with obtuse lobes; *petals* obcordate, green. *Fruit* globose, smooth, red.—*W.*—*L.*

History.—The *Black Currant* is a native of Europe and Siberia, growing in woods, cultivated in Europe and this country, and flowering in May. The *Red Currant* grows in cold, damp woods and bogs in this country and Europe, and is extensively cultivated in gardens; it also flowers in May. The fruit of these two plants is the part used, and imparts its virtues to water. The juice of *Red Currants* is said to contain citric acid, malic acid, sugar, vegetable jelly, gum, and extractive; that of *Black Currants* contains the same, with the addition of a peculiar volatile principle, and a violet coloring matter.

Properties and Uses.—The juice of these berries, especially of the Black Currant, is said to be diuretic and diaphoretic. They may be made into a jelly, a jam, paste, etc., and are very useful in febrile and inflammatory cases, in hoarseness and affections of the throat. The raw juice is an excellent refrigerant beverage in febrile diseases. A decoction of the bark of the Black Currant has proved useful in calculous affections, dropsy, and hemorrhoidal tumors. The Wild Black Currant, *Ribes Floridum*, of this country, possesses similar properties. It is a handsome shrub, growing from three to five feet high, with *leaves* one or two inches long, and somewhat wider, subcordate, from three to five lobed; *lobes* acute, spreading, sprinkled on both sides with yellowish, resinous dots, just visible to the naked eye. *Flowers* greenish-yellow, subcampanulate, in pendulous, pubescent, many-flowered *racemes*. *Calyx* cylindrical; *bracts* linear, longer than the pedicels; *petioles* one or two inches long. *Fruit* obovoid, smooth, black, insipid. It flowers in May and June.—*W.—G.*

ROBINIA PSEUDO-ACACIA.

Locust-tree.

Nat. Ord.—Fabaceæ, or Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE BARK AND LEAVES.

Description.—This is a tree from fifty to eighty feet in height, and from one to four feet thick; the bark is rough and dark. The numerous *branches* are smooth, and armed with stipular prickles. The *leaves* are unequally pinnate; the *leaflets* are in from eight to twelve pairs, ovate and oblong-ovate, thin, nearly sessile, and very smooth; *stipules* minute, bristle-form, partial. *Flowers* white, fragrant, showy, in numerous, axillary, pendulous racemes. *Calyx* five-cleft, short, campanulate, slightly two-lipped. *Standard* large and rounded, turned back, scarcely longer than the wings and keel. *Stamens* diadelphous; *style* bearded inside. *Legume* or *pod* linear, compressed, two to four inches in length, and about six lines wide, margined on the seed-bearing edge. *Seeds* several, small, brown, reniform.—*G.*—*W.* When young, the tree is armed with thorns which disappear in its maturity.

History.—This tree, known also by the names of *Black Locust*, and *Yellow Locust*, is found in several parts of the United States, principally west of the mountains, being seldom found north of Pennsylvania, or in the Atlantic Southern States; it blossoms in May. It is much valued for the durability, hardness and lightness of its wood. The bark and leaves are used, and yield their properties to water or alcohol. The bark of the root is the most active. The seeds are slightly acrid, and contain much oil, which may be obtained by expression. By steeping in water, their acridity is removed, and a very mild, useful meal may be then prepared from them. The inner bark is tough and fibrous.

Prof. H. Hlasiwetz has obtained the finest kind of asparagine from the root of this plant. It is obtained by evaporating a decoction to the consistence of a thin syrup, and then allowing it to stand for a few days; numerous, hard, rather large octohedral crystals are formed. These, after being twice recrystallized, are perfectly colorless and strongly refractive, do not effloresce, grate between the teeth, and have a slightly sweet mawkish taste. Their solution has a neutral reaction, and evolves ammonia when heated with solution of potassa; it is not precipitated by acetate of silver or lead, but basic acetate of lead and protonitrate of mercury furnish white precipitates. When heated, the crystals fuse, the mass afterward becomes brown, swells up, and evolves an unpleasant ammoniacal odor. They burn without residue, and dissolve in nitric and sulphuric acids without change. Thirty pounds of fresh root furnished more than two and a half ounces of pure substance.—*Chem. Gaz., Aug.* 15, 1855.

Properties and Uses.—A decoction of the bark of the root is tonic in small doses, but emetic and purgative in large ones. An ounce of the bark boiled in three gills of water operates as a cathartic in doses of half an ounce, given morning and evening. The bark is supposed to possess some acro-narcotic properties, as the juice of it has been known to produce coma and slight convulsions. The flowers possess antispasmodic properties, and form an excellent and agreeable syrup. The leaves operate mildly and efficiently as an emetic, in doses of thirty grains every twenty minutes.

ROCCELLA TINCTORIA.

Litmus.

Nat. Ord.—Lichenales. *Sex. Syst.*—Cryptogamia Lichens.

A PECULIAR COLORING MATTER.

Description.—*Roccella Tinctoria*, or *Orchilla-weed*, is a small dry lichen, with a rounded, glaucous, nearly erect *thallus*, forked and subdivided into numerous, branchy, roundish, gray, yellowish or brownish threads; *apothecia* scattered and elevated; *disk* flat, cæsius, pruinose, as broad as the border.

History.—This lichen is found on the maritime rocks of the eastern Atlantic islands, as the Azores, Canaries, etc.; the western coast of South America, south of England, Portland Islands, Scilly Islands, and various other countries. It contains a brown resin soluble in alcohol and ether, and becoming brownish-red with ammonia; wax; glutinous matter; insoluble starch; yellow extractive; yellowish-brown gummy matter; lichen-starch: tartrate and oxalate of lime; and chloride of sodium. The colorific principles are, according to Stenhouse, *Alpha-orsellic acid*, the rational formula for which is $C_{32} H_{15} O_3 + HO$; *Beta-orsellic acid*, $C_{34} H_{17} O_{14} + HO$; and *Erythric acid*, $C_{20} H_{10} O_9 + HO$. Litmus was formerly obtained from this plant alone, but other lichens have now in a great measure supplanted it, as the *Roccella Fusiformis* or *Angola-weed*, from

Angola and Madagascar, the *Lecanora Tartarea* or *Tartarean Moss*, from Norway and Sweden, the *Variolaria Dealbata* from Auvergne and the Pyrennees, and some others. The colorific principles of these are, *Erythric acid*, *Lecanoric acid* $C_{18} H_8 O_8$; *Evernic acid* $C_{34} H_{15} O_{13}+HO$, *Usnic acid* $C_{38} H_{17} O_{14}$, etc.; these acids are themselves colorless, but are converted into colored substances when exposed to the joint action of water, air and ammonia—but the precise chemical reactions by which the coloration is effected are unknown.

Lacmus or *Litmus* was formerly prepared only in Holland, but, at present, is manufactured from various lichens in Italy, France and Britain. It is made "by macerating powdered lichen for several weeks, with occasional agitation, in a mixture of urine, lime and potashes, in a wooden trough under shelter. A kind of fermentation takes place, and the lichen becomes first reddish, and subsequently blue. When the pulp has acquired a proper blue color, it is placed in brass or steel molds, and the cakes thus procured are subsequently dried. The molds consist of two parts; the lower one divided into rectangular cells, and the upper one supporting a series of metallic rods bearing small metallic disks, so arranged as to accurately fit the cells of the lower piece."—*P.* "Litmus is imported in the form of small, rectangular, light and friable cakes of an indigo-blue color. Examined by the microscope, we find sporules and portions of the epidermis, and mesothallus of some species of lichen, moss, leaves, sand, etc. Its odor is that of indigo and violets."—*P.*

Properties and Uses.—Litmus is employed in urinary, chemical and pharmaceutical analyses, and is a familiar test for free acids and alkalies. The former impart a red color to blue Litmus; the latter return the original blue color to the reddened Litmus. Carbonate of lime dissolved in water by a considerable excess of carbonic acid, will also restore the blue color of reddened Litmus. It is used either in infusion, or in the form of Litmus paper. The infusion, sometimes erroneously called tincture of Litmus, is made by adding one part of Litmus to twenty-five parts of distilled water, to which, for the purpose of preserving it, about one-tenth part of spirit or alcohol may be added. *Blue Litmus-paper*, charta exploratoria cœrulea, is prepared by dipping strips of paper in a clear and strong infusion of Litmus, or by brushing the infusion over the paper. White unsized paper is the best for this purpose; and the infusion may be made by adding one part of Litmus to six parts of boiling water. Good Litmus-paper should be of uniform color, neither too light nor too dark, and when carefully dried, should be kept in well-stopped vessels in a dark place; when it has a purplish tint, it is a more delicate test for acids than when pure blue. An extremely delicate test-paper may be made by almost neutralizing the alkali contained in the Litmus; thus: divide the filtered infusion of Litmus into two parts; stir one portion with a glass rod which has been previously dipped into very dilute sulphuric acid, and repeat this until the liquid begins to look reddish; then add the other portion of liquid, and immerse the paper in it.—*P.* *Red Litmus-paper*, charta exploratoria rubefacta, is best prepared by dipping the blue paper in a very dilute sulphuric acid, merely acid enough to slightly redden it.

Orchil or *archil* is used for dyeing, coloring, and staining. There are two kinds, called *blue orchil* and *red orchil*, which differ merely in the degree of their red tint. They are deep-reddish purple liquids, with an ammoniacal odor. It is prepared by steeping the lichens in an ammoniacal liquor, in a covered wooden vessel.

Cudbear is obtained by the same process as orchil, and when the proper purplish-red color has been developed, the mixture is dried in the air and reduced to powder. It is used as a dye, and sometimes as a test for acids and alkalies.—*P.*

ROSA CANINA.

Dog-Rose.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE RECENT FRUIT.

Description.—This plant, also known by the names of *Hip-tree*, or *Wild-brier*, is a soft, branched, smooth bush, with long green curved *rootshoots*, which are covered with equal, remote, strong, compressed, falcate *prickles;* the *leaflets* are from five to nine, ovate, firm, without glandular pubescence, with acute, incurved and often double serratures. The *flowers* with leafy bracts. *Sepals* partly pinnated, usually naked as well as the tube of the calyx. *Petals* white or pink, obcordate, fragrant; *throat of the calyx* thick and quite closed up. *Fruit* red, succulent, ovoid, truncated, in consequence of the fall of the sepals.—*L.*—*W.*

History.—This plant is indigenous to Europe, and introduced into this country; it usually attains the height of six or ten feet, and flowers in June and July. The flowers are succeeded by a scarlet fruit called *Hip*. The fruit (*Rosæ Fructus*) is the only officinal part, it is inodorous, but possesses a rather pleasant, sweetish, acidulous taste, which is increased by the action of frost. The hip or fruit consists of the developed tube of the calyx, inclosing within its cavity numerous carpels or true fruits; these must be carefully removed before it is used for pharmaceutic purposes. It then, after having been dried, consists of gum, citric acid, impure malic acid, a large proportion of uncrystallizable sugar, various salts, and traces of wax, resin, and volatile oil. Its properties are preserved by beating the pulp with sugar.—*C.*

Properties and Uses.—The conserve made by beating the pulp with sugar, is called Conserve of Dog-Rose, or Conserve of Hips (*Confectio Rosæ Caninæ*), and is tenacious, retaining its softness for a long time, even under exposure to the air. It is a useful material for forming pill-masses, and, as it contains less tannic acid, may be used as a substitute for the conserve of red roses, when preparations of iron are to enter into the pill mass.

ROSA CENTIFOLIA.

Hundred-leaved Rose.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE PETALS.

Description.—This is an erect shrub, from three to six feet in height, and having the branches closely covered with nearly straight *prickles*, scarcely dilated at base, and glandular bristles of various forms and sizes; the large ones falcate. *Shoots* erect. The *leaves* are unequally pinnated; *leaflets* five to seven, oblong or ovate, glandular-ciliate on the margin, subpilose beneath. The *flowers* are large, usually of a pink color, but varying in hue, form, size, etc., through a hundred known varieties, several together, drooping, with leafy bracts; *flower-bud* short, ovoid. *Sepals* leafy, compound, viscid, spreading in flower. *Petals* five, usually pale-red. *Fruit* ovoid; *calyx* and *peduncles* glandular-hispid, viscid, and fragrant.—*L.*—*W.*

History.—The native country of this rose-bush is unknown; but it is extensively cultivated in nearly all parts of the world, forming a valuable ornament to gardens. There are many varieties, the most fragrant of which are the best adapted for use. The parts employed are the petals, which ought to be gathered before they are fully blown, freed from the calyx cups and stamens, and dried in the air. To preserve them they are frequently salted. Their odor is fragrant, and which is said to be singularly exalted by iodine; and their taste sweetish, slightly acid and bitter, with a faint astringency. Analysis has detected in them volatile oil (otto of roses), gallic acid, coloring matter, a saccharine matter, lignin, mineral salts, and oxide of iron.

Properties and Uses.—This rose, on account of its delightful fragrancy, is principally used for the distillation of Rose-water, so much used in collyria and other lotions; taken internally, it is said to be gently aperient, but is seldom, if ever, administered for this purpose.

Off. Prep.—Aqua Rosæ; Linimentum Terebinthinæ; Lotio Ætheris Composita; Lotio Sassafras; Unguentum Aquæ Rosæ.

ROSA GALLICA.

Red Rose.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE PETALS.

Description.—The *Red*, *French*, or *Provins Rose*, is a dwarfish, stiff, short-branched bush, from two to three feet high, with the *stem* and *petioles* armed with numerous fine, nearly equal, uniform prickles and glandular bristles intermixed. The *leaflets*, mostly five, are stiff, elliptical, and rugose. The *flowers* are large, erect, several together, with leafy bracts. The *sepals* are ovate, leafy, compound. The *petals* are five or more, obcordate, large, spreading, and of a rich crimson color. The *fruit* is oblong or ovoid, glossy, very coriaceous.—*L.*—*W.*

History.—This plant is indigenous to Austria, and other parts of the middle and south of Europe, and is common in the gardens of that country and the United States. There are not less than two hundred varieties known in cultivation. With this plant, as with the previous ones, cultivation multiplies the petals very much, by the conversion of stamina. The officinal parts are the petals. They should be collected previous to the expansion of the flowers, freed from their calyces and white claws or heels, and speedily dried in the sun or by artificial heat. When dried they are sifted to remove the stamens and insects, and should be kept in a dry place, as for instance, in well-covered tin canisters or bottles. "When dried they have a velvety appearance; their color is purplish-red; their odor is much improved by desiccation; and their taste is bitterish and astringent."—*P.* Their infusion yields a black precipitate with the sesquioxide salts of iron, and is changed to a scarlet color by sulphuric acid. Water takes up their properties. Cartier found in them volatile oil, coloring matter, tannic and gallic acids, fatty matter, albumen, soluble potassa salts, calcareous insoluble salts, silica, and oxide of iron.

Properties and Uses.—Red Roses are tonic and mildly astringent. They have been used in passive hemorrhages, and excessive mucous discharges. They have also been found beneficial in bowel complaints, and are more commonly used in ophthalmic diseases, as a poultice, or the pith of sassafras and infusion of roses as a collyrium in acute ophthalmia. The infusion is also used as a vehicle for various other remedies. The confection is mostly employed as a basis for making pills. If iron be added to the confection, or any of its preparations, it forms a hard pill, which passes through the alimentary canal unchanged.

Off. Prep.—Confectio Rosæ.

ROSMARINUS OFFICINALIS.

Rosemary.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE TOPS.

Description.—Rosemary is an erect, perennial, evergreen shrub, two to four feet high, with numerous branches of an ash-color, and densely leafy. The *leaves* are sessile, opposite, linear, over an inch in length, and about two lines broad, entire, obtuse at the summit, revolute at the margins, of a firm consistence, dark-green and shining above, downy and sometimes whitish beneath. The *flowers* are few, bright blue or white, subsessile, and disposed in short, opposite, axillary and terminal racemes. The *bracts* are shorter than the calyx. The *calyx* is purplish, campanulate and villose; the *corolla* is not ringed in the inside, somewhat inflated in the throat, with two equal lips, the upper of which is erect and emarginate, the lower trifid, with the middle lobe very large, concave, and hanging down. *Stamens* two; *filaments* minutely toothed near the base; *anthers* linear, with two divaricating confluent cells. *Upper lobe* of style very short. *Seeds* four, oblong, naked at the base of the calyx.—*L.*—*W.*

History.—Rosemary is a native of the countries surrounding the Mediterranean, and is cultivated in nearly every garden for its beauty and fragrance, flowering in April and May; the parts used in medicine are the flowering tops, which have a powerful, diffusive, camphoraceous odor, and an aromatic, bitter taste; they yield their properties to water or spirit, but more effectually to alcohol. Age and drying impair their odor and virtues, which are owing to a volatile oil, and which may be procured by distillation. On standing for some time, the oil deposits crystals of stearoptin.

Properties and Uses.—Rosemary is stimulant, antispasmodic, and emmenagogue; seldom used in this country, except as a perfume for ointments, liniments, embrocations, etc. The oil is principally employed. Dose, internally, from three to six drops.

Off. Prep.—Oleum Rosmarini.

RUBIA TINCTORUM.

Madder.

Nat. Ord.—Rubiaceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT.

Description.—*Dyer's Madder* has a perennial, long, cylindrical *root*, about the thickness of a quill, branched, externally deep, reddish-brown. The *stems* are several, herbaceous, diffuse, brittle, branched, tetragonal, very rough, with sharp hooks. The *leaves* are from four to six in a whorl, lanceolate or oblong-lanceolate, mucronate, somewhat membranous, with pinnated veins, two or three inches long, and nearly one-third as wide. The *flowers* are small and yellow. *Corolla* rotate, five-parted; *lobes* ovate-lanceolate, apiculate. *Stamens* five, short; *styles* two, short; *anthers* ovate-oblong; *stigmas* conical. *Fruit* didymous, globose, baccate, shining, juicy.—*L.*—*Wi.*

History.—Madder is a native of the Mediterranean, and southern European countries, and is extensively cultivated for the use of the dyer in various parts of that continent; the drug is chiefly imported from Holland and France. The root is collected in the third year of the plant, when it is freed from its epidermis and dried. It consists of a dark, easily separable cortex, whose epidermis is thin, and of a ligneous meditullium, which in the fresh state is yellow, but becomes reddish by drying.

It has a feeble odor, and a bitter and astringent taste, which properties, together with its color, are communicated to alcohol or water. The microscope discovers numerous needle-shaped crystals or raphides in the cells of the root-bark.—*P.* Madder has been analyzed by several chemists, and found to contain coloring matter, resin, gum, bitter extractive, sugar, lignin, etc. Decaisne has shown that in the living state the root contains only yellow coloring matter, which is held in solution, and resides not in any peculiar vessels or secretory apparatus, but in the cellular tissue and latex vessels. By exposure to air this yellow liquid becomes red, cloudy, and granular. Runge states that Madder contains two colorless acids, *madderic* and *rubiacic*, and five coloring matters, *Madder purple*, *Madder red*, *Madder orange*, *Madder yellow*, and *Madder brown*. To two of these Madder is supposed to owe its value as a dye-stuff, viz.: Madder red, and Madder purple.

Madder red, *alizarin*, or *lizaric acid*, occurs in the anhydrous and hydrated form. The *anhydrous*, $C_{20} H_6 O_6$, has a red color passing into yellow; it fuses and sublimes in orange-colored needles, which are soluble in alcohol, ether, and boiling water, forming yellow solutions. The slightest trace of alkali colors the aqueous solution red. It is insoluble in a cold solution of alum, and forms a red solution in hydrated sulphuric acid. *Hydrated alizarin*, $C_{20} H_{10} O_{10}$, or $C_{20} H_6 O_6 + 4$ Aq., occurs in small scales, having the appearance of mosaic gold.

Madder purple, *purpurin*, *oxylizaric acid*, differs from the preceding chiefly in its solubility in solution of alum, giving a fine bright red color. *Anhydrous purpurin*, $C_{18} H_6 O_6$, is in the form of red acicular crystals, readily soluble in warm water, also in alcohol, ether, concentrated sulphuric acid, and solution of potassa. Its aqueous, alcoholic, and potassa solutions are red. *Hydrated purpurin*, $C_{18} H_7 O_7$, is in the form of orange-colored crystals.

Properties and Uses.—Madder is supposed to promote the menstrual and urinary discharges, and has been recommended for such purposes by various practitioners. However, it is not in general use, as the profession lack confidence in its action. The dose is thirty grains, three or four times a day. Animals fed upon Madder have their bones colored red by it.

Leonhardi has obtained a patent for an "Alizarine Ink," which does not contain gum, is prevented from becoming moldy by its indigo and acetate of iron, and in which the sulphate of indigo prevents the tannate of iron from separating. It is prepared by digesting twenty-four parts of Aleppo galls and three parts of Dutch madder with one hundred and twenty parts of water. The liquid is filtered and mixed with 1.2 parts solution of indigo, 6.2 sulphate of iron, and two parts crude acetate of iron solution. It is said to be a superior ink.

RUBUS STRIGOSUS.

Red Raspberry.

RUBUS TRIVIALIS.

Dewberry or Low Blackberry.

RUBUS VILLOSUS.

Blackberry.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Polygynia.

THE BARK OF THE ROOT, AND RASPBERRY LEAVES.

Description.—RUBUS STRIGOSUS is a shrubby, strongly hispid plant, about four feet in height. The *leaves* are pinnately three or five foliate, with the *leaflets* oblong-ovate or oval, obtuse at base, pointed, coarsely and unequally serrate, green above, canescent tomentose beneath, lateral ones sessile, odd one often subcordate at base, and distinctly petiolulate; they are from one and a half to two and a half inches long, and about from one-third to two-thirds as wide. The *flowers* are white, and in panicled corymbs. The *corolla* is cup-shaped, and about the length of the calyx. The *fruit* is a red berry, hemispherical, composed of many juicy, one-seeded acini, on a dry receptacle, of a rich delicious flavor.—*W.*

RUBUS TRIVIALIS or Rubus Canadensis, sometimes called *Low or Creeping Blackberry*, has a slender, prickly *stem*, procumbent or trailing several yards upon the ground. The *leaves* are petiolate and composed of three (or pedately five or seven) *leaflets*, which are elliptical, or rhomboidal-oval, acute, thin, membranaceous, sharply and unequally cut-serrate, often somewhat incised, somewhat pubescent, from an inch to an inch and a half long, and about one-half as wide. The common *petioles* are one or two inches long, and together with the *peduncles* are armed with recurved, bristly prickles; sometimes naked. The *stipules* are linear, subulate, entire, or serrate. The *flowers* are large, white, nearly solitary, on slender, elongated, prickly, somewhat corymbed pedicels, with leafy bracts; the lower peduncles distant, the upper crowded. The *petals* are obovate, in one variety orbicular, and twice as long as the calyx. *Fruit* large, black, very sweet and juicy.—*W.*—*T.*—*G.*

RUBUS VILLOSUS, is a perennial, half shrubby plant, pubescent and prickly. Its *root* woody, knotty, and horizontal, and sends up a tall, branching, slender, prickly, more or less furrowed, and angular *stem*, recurved at top, and from three to six feet high. The *leaves* mostly in threes, sometimes fives, and often solitary, on a channeled, hairy petiole; the *leaflets* are ovate, acuminate, sharply and unequally serrate, covered with scattered hairs above, and with a thick soft pubescence underneath; the terminal stalked, the two side ones sessile; *petiole* and back of the *midrib*, commonly armed with short recurved prickles. *Branchlets*, *stalks*, and lower surface of the leaves hairy and glandular; leaflets from two and a half to four inches long, by one and a half to two and a half inches wide. *Flowers* large, in erect racemes with a hairy, prickly stalk; *pedicels* slender, an inch or two long, with glandular hairs and lanceolate bracts. *Petals* five, white, ovate or oblong, concave, contracted into a short claw at base. *Calyx* short, with ovate, hairy segments, ending in an acuminate point, or a lanceolate leaflet. *Stamens* numerous, inserted on the calyx along with the petals; *filaments* slender; *anthers* small. The *fruit* is large, at first green, then red, and when matured, black; it consists of about twenty roundish, shining, black, fleshy *carpels*, closely collected into an ovate or oblong head, subacid, well-flavored, and ripening in August and September.—*L.*—*W.*—*G.*

History.—The *Red Raspberry* grows wild, and is common to Canada and the Northern United States, growing in hedges, neglected fields, thickets and hills, flowering in May, and ripening its fruit from June to August. The leaves are the officinal parts. They impart their properties to water, giving to the infusion an odor and flavor somewhat similar to that of some kinds of black tea.

The *Dewberry* likewise grows wild in dry, stony fields, gravelly soil, and neglected grounds, and is common from Canada to Virginia, flowering in May, and ripening its fruit in July and August. The root is the officinal part, it is generally smaller than the Blackberry root, with its external covering transversely cracked, of a dark brownish-gray color, odorless, and woody internally. *Blackberry* grows abundantly in most parts of the United States, in old fields, by the roadside, and on the borders of thickets, flowering from May to July, and maturing its fruit in August. The root is the part used; as met with in the shops it is of a brownish-gray color externally, sometimes with a reddish tinge, in pieces of various lengths, having a diameter varying from two to ten or twelve lines, furrowed longitudinally, and woody internally. The barks of these two plants have an astringent, slightly bitter taste.

These plants possess similar medicinal properties, and may be substituted the one for the other; and as they belong to the same genus, I have placed them together. The bark of the old roots, or the smaller roots, of Dewberry and Blackberry, should always be preferred as the woody portion is inert; their odor and taste are similar, and they impart their virtues to water, alcohol, or Port wine. They contain a large quantity of tannic acid, with bitter extractive; no accurate analysis has been made of them. The *fruits* of these plants are much esteemed as an article of diet, and have been manufactured into cordials, jam, jelly, and syrup. They contain volatile oil, citric and malic acids, sugar, mucus, etc.

Properties and Uses.—These plants are useful as astringents. An infusion or decoction of the leaves of Raspberry, or of the bark of the roots of the other two, has been found an excellent remedy in diarrhea, dysentery, cholera-infantum, relaxed conditions of the intestines of children, passive hemorrhage from the stomach, bowels, or uterus, and in colliquative diarrhea. The decoction used as an injection, is useful in gonorrhea, gleet, leucorrhea, and prolapsus uteri and ani; in prolapsus uteri, it may be used either alone or combined with the internal use of a decoction of equal parts of black cohosh and Blackberry roots, taken freely. The leaves of Raspberry, in decoction with cream, will allay nausea and vomiting, and combined with aromatics has been found useful in diarrhea, cholera-morbus and cholera-infantum. It is said that the Raspberry will, during labor, increase the activity of the uterine contractions when these are feeble, even in instances where ergot has failed, and that it has been found serviceable in after-pains. The *fruit*, especially that of the Blackberry, makes an excellent syrup, which is of much service in dysentery, being pleasant to the taste, mitigating the accompanying tenesmus and sufferings of the patient, and ultimately effecting a cure. The fruit of the Raspberry contains very little nourishment, but is an agreeable acidulous article, rarely disturbing the stomach, and when eaten freely, promotes the action of the bowels. Raspberry syrup added to water, forms a refreshing and beneficial beverage for fever-patients, and during convalescence. The jelly or jam may likewise be used in similar cases; that of the Blackberries being more astringent, is better adapted to cases of diarrhea, dysentery, and cholera-infantum. Dose of the decoction of these plants, from one to four fluidounces several times a day; of the pulverized root-bark from twenty to thirty grains.

The *Rubus Odoratus*, or *Rose-flowering Raspberry*, has an erect or reclining, unarmed, glandular-pilose, shrubby *stem*, from three to five feet in height. The *leaves* are from four to eight inches long, nearly as wide, cordate at base, palmately three to five lobed, unequally serrate, *lobes* acuminate, the middle one prolonged, *petioles* two or three inches long, and with the peduncles, calyx and branches, clothed with viscid hairs. *Flowers* many, large, nearly two inches in diameter, in terminal cormybs. *Petals* orbicular, purple-rose color; *stamens* numerous, whitish. *Fruit* broad and thin, bright-red, sweet. This plant grows on rocky banks, and in upland woods in the United States and Canada, flowering in June and July, and ripening its fruit in August. A decoction of it is said to be powerfully diuretic, and may be used freely in affections of the urinary organs, and dropsy.—*W.*—*G.*

RUDBECKIA LACINIATA.

Thimbleweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Frustranea.

THE WHOLE PLANT.

Description.—This plant, also known by the names of *Cone-disk*, *Sunflower*, and *Tall Cone-flower*, is a tall, showy, indigenous, perennial plant, with a round, glabrous, branching *stem*, from three to eight feet in height. The *leaves* are alternate, smooth or roughish, the lower ones pinnate with from five to seven cut or three-lobed leaflets, petiolate, the upper ones irregularly three to five parted; the lobes ovate-lanceolate, pointed. The *flowers* are large, and terminal; *pappus* crenate; *chaff* truncate and downy at the tip. *Rays* one or two inches long, oblanceolate, bright yellow, spreading or drooping. *Disk* oblong-conical, and columnar in fruit, greenish-yellow.—*G.*—*W.*

History.—This plant grows in various parts of the United States, in damp places, low thickets, edges of swamps and ditches, etc., flowering from July to September. The whole herb is recommended to be used. Its chemical reactions, as well as formation, are not known. It imparts its properties to water.

Properties and Uses.—Thimbleweed is a valuable diuretic, tonic and balsamic. Useful in many diseases of the urinary organs, and highly recommended in strangury, Bright's disease, and wasting or atrophy of the kidneys. Dose of the decoction, *ad libitum.*

The RUDBECKIA PURPUREA of Linnæus, variously called *Red Sun-flower Comb-flower*, or *Purple Cone-flower* (the *Echinacea Purpurea* of Mœnchausen), has a thick, black *root*, with branched, sulcate, smooth, or rough *stems*, growing from three to five feet in height. The *leaves* are alternate, from four to eight inches long, and about one-fifth as wide, rough, with short, stiff bristles; the lower ones broad-ovate, attenuate at base, five-nerved, veiny, long-petioled, remotely-toothed; the cauline ones lanceolate-ovate, acuminate, nearly entire. *Heads* large, solitary, on long peduncles. *Disk* thickly beset with the stiff, pointed, brown chaff. *Rays* from fifteen to twenty, two or three inches long, dull purple, pendulous, bifid. This plant is common to the Western prairies and banks, and is found also in the Southern States flowering from July to September. The root is very pungent to the taste, and has been popularly used in medicine under the name of *Black Sampson;* it is stated to have been employed with much benefit in syphilis. Both of the above plants deserve a full and thorough investigation from the profession. From all I have been able to learn, the latter plant is equal to the stillingia in medicinal efficacy. —*W.*—*G.*

RUMEX ACETOSA.

Sorrel.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Hexandria Trigynia.

THE LEAVES.

Description.—Rumex Acetosa has a long and tapering, somewhat woody *root*, with an erect, simple, leafy, striated *stem*, one or two feet high. The *lower leaves* are petiolate, somewhat ovate, arrow-shaped, with two lateral teeth; the *upper ones* are sessile, more oblong, and narrower. *Stipule* tubular, membranous, fringed. *Clusters* erect, compound, whorled, leafless. *Flowers* diœcious. *Males* green, with a reddish tinge; inner *sepals* ovate, rather larger than the outer. *Females* rather redder; inner *sepals* ovate, obtuse, red, entire, each bearing an oblong, pale tubercle. The whole herb is smooth and powerfully and agreeably acid. The root is astringent. The plant is common to England and is sometimes cultivated in this country.—*L.*

RUMEX ACETOSELLA, *Field* or *Sheep Sorrel*, has a leafy *stem* from six to twelve inches in height, with lanceolate-hastate, pleasantly-acid *leaves*. The *flowers* small, reddish, collected in panicled racemes. The *valves* are ovate, scarcely enlarging in fruit, destitute of granules. The *stamens* and *styles* on separate plants; the *styles* adherent to the angles of the ovary. This weed is found in abundance throughout the United States, growing in pastures, waste grounds, and worn fields, flowering all summer. —*G.*—*W.*

History.—The leaves of these two plants are the parts used in medicine. They are inodorous, and have an agreeable, acid, slightly astringent taste. The leaves are composed of superoxalate of potassa, tartaric acid, mucilage, fecula, chlorophyll, tannic acid, and woody fiber. By drying, their acidity is lost. They are used alone, or in an infusion of the fresh leaves.

Properties and Uses.—Fresh Sorrel leaves are refrigerant and diuretic. An infusion is useful in febrile and inflammatory diseases, and in scorbutic diseases. They may likewise be used as a salad, or boiled like spinage. The leaves eaten freely are said to have produced poisonous effects, owing to the oxalic acid they contain. Wrapped up and roasted, the leaves form an excellent application to indolent tumors, wens, boils, etc., hastening suppuration. The inspissated juice, applied on leather, is said to form an effectual but painful cure for tumors and incipient cancers. Acting upon this hint, the following preparation has been found a useful remedy in cutaneous cancer, viz: Take, of burnt alum, one drachm; citric or tartaric acid, two drachms; oxalic acid, two drachms; rain-water, half a pint. Mix. To be applied by means of a camel's-hair pencil.

RUMEX AQUATICUS.
Great Water Dock.

RUMEX BRITANNICA.
Water Dock.

RUMEX OBTUSIFOLIUS.
Blunt-leaved Dock.

RUMEX CRISPUS.
Yellow Dock.

Nat. Ord.—Polygonaceæ. *Sex. Syst.*—Hexandria Trigynia.

THE ROOT.

Description.—Rumex Aquaticus has a stout black *root*, whitish internally, with a thick, erect *stem*, from three to five feet high. The *leaves* are a foot or more in length, and three to five inches wide, smooth, lanceolate, pointed, the lower ones cordate, on long petioles. The *flowers* are verticillate, and are disposed in a terminal, leafy panicle. *Pedicels* capillary, drooping. The three *petals*, or as termed by some botanists, the three inner divisions of the calyx, which form a kind of triangle, and are termed valves, are large, broadly-ovate, obtuse, entire, minutely granular along the center. This is an European plant, but introduced into this country, growing in wet places, ditches, etc., and flowering in July.—*W.*—*G.*

RUMEX BRITANNICA, or *Yellowrooted Water-Dock*, has a large *root*, externally dark, internally yellowish, with an angular, furrowed, branching *stem*, two or three feet high. The *leaves* are broad-lanceolate, acute at both ends, from three to five inches long, petiolate, flat, smooth, with the sheathing stipules slightly rent. The *flowers* are perfect, in verticillate fascicles, collected into a large, terminal panicle, the spikes of which are nearly leafless. The *pedicels* are capillary and nodding in fruit. The *calyx valves* large, cordate, entire, graniferous, two of the grains small or abortive. This is an indigenous plant, growing in muddy places, along banks of streams, etc., in various parts of the United States, and bearing flowers from May to August.—*W.*—*G.*—*Wi.*

RUMEX OBTUSIFOLIUS, or *Blunt-leaved Dock*, has its *root* brown outside and yellow within; the *stem* is two or three feet high, furrowed, somewhat roughish, branching, and leafy. The *radical leaves* are about a foot long, and five or six inches in width, ovate-cordate, obtuse, rather downy on the veins underneath, somewhat wavy margined, often with stalk and veins red; the upper one are oblong-lanceolate, and acute. The *flowers* are in long, nearly naked racemes; *whorls* loose and distant; *valves* ovate-halbert-shaped, sharply denticulate at the base, strongly reticulated, one of them principally bearing a granule on the back. This is a common weed, introduced from Europe, growing about houses and fields, and flowering from May to August.—*G.*—*W.*

RUMEX CRISPUS, or *Yellow Dock*, is the species of Dock more commonly used by physicians, and is, perhaps, the only one entitled to an officinal rank in our Dispensatory. It has a deep spindle-shaped, yellow *root*, with a *stem* two or three feet high, angular, furrowed, somewhat zigzag, smooth to the touch, panicled, leafy. The *leaves* are lanceolate, acute, strongly undulated, and crisped at the edges, of a light-green color; the radical ones on long petioles, truncate, or subcordate at base; the uppermost narrower, and nearly sessile. The *flowers* are numerous, pale-green, drooping, disposed in a large panicle consisting of many wand-like racemes of half-whorls, interspersed with leaves below. *Inner sepals*, or *valves*, much larger than the outer, veiny, waved, entire, ovate, each bearing a large ovate brown grain or tubercle on the back. *Nut* contracted at each end, with three blunt or tumid angles. This plant is also introduced into this country from Europe, growing in cultivated grounds, waste grounds, about rubbish, etc., flowering in June and July.—*L.*—*G.*—*W.*

History.—I have placed these four species of Dock together, in consequence of their possessing similar medicinal properties, and which under separate heads would lead to an unnecessary repetition. The roots of several other species have been medicinally employed, and may be used indiscriminately with the above, as the *R. Patientia* and *R. Alpinus* of Europe, and the *R. Acutus* and *R. Sanguineus* of this country. These various Dock-roots have hardly any odor, an astringent, bitterish taste, and yield their virtues to alcohol, or boiling water. They have not been satisfactorily analyzed. The young leaves of some of the species are sometimes used as greens. As found in the shops, Yellow Dock-root is in slices cut transversely and dried, and occasionally the root is divided longitudinally into halves or quarters; it is sometimes called *Sour Dock*, *Narrow Dock*, or *Curled Dock*.

Properties and Uses.—The Dock-roots are alterative, tonic, mildly astringent, and detergent, and are eminently useful in scorbutic, cutaneous, scrofulous, scirrhous, and syphilitic affections, leprosy, elephantiasis, etc.; for which purpose we prefer the *Rumex Crispus*. The fresh root bruised in cream, lard, or fresh butter, forms an excellent ointment for scrofulous ulcers, scrofulous ophthalmia, itch, and a discutient for indolent glandular tumors. An ointment of the root of *R. Crispus*, and the root-bark of *Celastrus Scandens*, with gunpowder, is said to form a certain cure for the itch, as well as being of value in other cutaneous diseases and ulcers. The powdered root is recommended as a dentifrice, especially when the gums are spongy. Dose of the decoction or syrup, from one to four fluidounces, three times a day.

Off. Prep.—Decoctum Rumecis; Extractum Rumecis Hydro-alcoholicum; Syrupus Rumecis Compositus.

RUTA GRAVEOLENS.

Rue.

Nat. Ord.—Rutaceæ. *Sex. Syst.*—Decandria Monogynia.

LEAVES AND UNRIPE FRUIT.

Description.—Rue is a glaucous, hairless, erect, suffruticose, perennial plant, with branching *stems*, two or three feet in height, woody below with a grayish, rough bark; herbaceous and smooth above. The *leaves* are alternate two and three, pinnately divided; the *leaflets* are sessile, oblong, obtuse, dotted, glaucous or bluish-green, from six to ten lines long, by two to four wide; terminal ones obovate-cuneate. The *flowers* are yellow, or pale greenish-yellow, in terminal, corymbose racemes; *peduncles* subdividing. *Petals* four, yellow, unguiculate, concave, wavy, a little irregularly toothed. *Stamens* eight, longer than the petals; *filaments* subulate; *anthers* ovate, obtuse, yellow. *Styles* four, distinct at the base, where they spring from the inner angle of the carpels above the common axis; united upward into a single pistil which is attenuated toward the apex; *stigma* four-furrowed. *Carpels* terminal, leafless, trichotomous, cymose. *Fruit* a roundish capsule, warted, four-lobed, each lobe opening into two valves. —*L.*—*W.* It is remarkable that the anthers move in turns to the pistillum, and after having shed their pollen retire.

History.—Rue is a well known evergreen, half-shrubby plant, common to Southern Europe, and introduced into this country as a garden-plant; it flowers in July and August. The whole plant has a strong, heavy, unpleasant smell, and a bitter, acrid, pungent taste, which is owing to its volatile oil. The leaves are the parts used, and when fresh are said to irritate and even vesicate the surface to which they are applied. They should be gathered when the seed-vessels are well-developed, yet still green; the seed-vessels of the unripe fruit are covered with large oil vesicles, and may likewise be used for medical purposes. Rue yields its properties to boiling water in infusion, but alcohol is its best solvent. The plant loses much of its activity by drying. Mähl analyzed the plant in 1811, and found in it volatile oil, bitter extractive, chlorophyll, peculiar vegetable animal matter precipitable by tincture of nut-galls, malic acid, gum, albumen, starch, and woody fiber. An acid, termed Rutinic, has also been found in it.

Properties and Uses.—Rue is emmenagogue, ecbolic, anthelmintic and antispasmodic. In large doses it seems to be a narcotico-acrid poison. It causes abortion when used by pregnant females, accompanied with inflammation of the stomach and bowels, with cerebral disturbance. Its action is chiefly directed upon the uterus, and is capable of exciting menorrhagia, inflammation, and miscarriage. It has been successfully used in flatulent colic, hysteria, some nervous complaints, epilepsy, and as an excellent vermifuge. Dose of the leaves, from ten to twenty grains; of the decoction, from one to four fluidounces; of the oil, from two to six drops.

The following is the preparation of a person in Indiana who has the reputation of effecting cures of epilepsy: Half fill a gallon bottle with equal parts of green Rue and garlic-roots, add seven ounces of assafetida, and fill the bottle with old whisky. After macerating for ten or twelve days, it may be taken in doses of a wineglassful every morning, on an empty stomach, and another every night on going to bed.

Off. Prep.—Infusum Rutæ; Oleum Rutæ.

SABBATIA ANGULARIS.

American Centaury.

Nat. Ord.—Gentianaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE HERB.

Description.—This plant, also called *Rose-pink*, has a yellow, fibrous, biennial *root*, with an erect, smooth, quadrangular *stem*, with the angles winged, having many opposite *branches*, and growing from one to two feet in height. The *leaves* are opposite, sessile, ovate, cordate at base, clasping the stem, five-veined, smooth, entire, and from one to two inches in length by half an inch to one and a half inches in width. The *flowers* are numerous, from an inch and a quarter to an inch and a half in diameter, of a rich rose-color, terminal, on elongated peduncles, greenish or whitish in the center, and forming a large corymbose panicle. The *calyx* with five lanceolate segments; *tube of calyx* angular. *Corolla* rotate, five-parted, with oval segments twice as long as the calyx. *Stamens* five; *filaments* slender; *anthers* yellow, oblong, slightly recurved when the flower first opens,—after shedding their pollen they become revolute and curl up. *Ovary* ovate; *style* longer than the stamens, declined; *stigma* two-parted, the segments separate at first, but gradually become twisted spirally together. *Capsule*, one-celled, two-valved, with numerous seeds.—*L.*—*W.*

History.—This plant is common to most parts of the United States, growing in moist meadows, among high grass, on the prairies, and in damp rich soils, flowering from June to September. The whole plant is used. It has a very bitter taste, and yields its virtues to water or alcohol. The best time for gathering it is during its flowering season. It is preferable to the European Centaury.

Properties and Uses.—Tonic. Used in fall periodic febrile diseases, both as a preventive and as a remedy. It is also serviceable as a bitter tonic in dyspepsia, and convalescence from fevers. When administered in warm infusion it is a domestic remedy for worms, and to restore the menstrual secretion. Dose of the powder from half a drachm to a drachm; of the cold infusion four fluidounces every two or three hours; of the tincture, one or two fluidrachms; and of the extract from two to six grains.

Off. Prep.—Infusum Sabbatiæ.

SACCHARUM OFFICINARUM.

Sugarcane.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

THE SUGAR, OR CONCRETE JUICE.

Description.—Sugarcane is a plant having an articulated, juicy *root*, from which proceed several erect, solid *stems*, ten or twelve feet high, an inch or two in diameter, of a yellow, purple, red or striped color externally, internally whitish, juicy, saccharine, pithy. The leaves which are situated at the joints, at intervals of about two or three inches, are flat, sheathing at base, from two to four feet in length, and about one-fourth as wide, the margins armed with numerous, small, sharp teeth. The *panicle* is terminal, spreading, erect, oblong, from one to three feet in length, and grayish from the quantity of long loose hairs surrounding the florets; the *branches* are alternate and very spreading. *Rachis* striated. *Florets* diœcious, in pairs. *Glumes* smooth. *Paleæ* smooth, membranous, of a pink color.

History.—This plant is cultivated in the East and West Indies, and in some of the southern United States; its native country is unknown.

Those canes which have not flowered, or have no tendency to flower, are the richest in Sugar; and the lower part of them contains the greatest proportion. The juice constitutes nearly one-half of the cane, and when expressed, ferments rapidly, forming an acid, so that it requires to be promptly evaporated, and its acidity neutralized, before the Sugar can be made. The Sugar and molasses of commerce are obtained from the juice of this plant, and are prepared as follows: The matured stems of the plant are subjected to pressure between rollers, and their juice expressed; as it ferments in a few minutes forming an acid, it is saturated with lime, and then promptly evaporated to a proper consistence, when brownish crystalline grains form, which, when dried in the sun, constitutes *brown Sugar*, and the residual liquid, when duly concentrated, is *molasses*.

The juice of Sugarcane is of a pale, yellowish-gray color, with a faint fragrant odor, and an agreeable sweet taste. It contains cane Sugar in great quantity, a notable amount of glucose or grape Sugar, gum or dextrine, phosphates of lime and magnesia, some other salts of lime and magnesia, sulphates and chlorides, potassa, soda, and a peculiar azotized albuminous matter, readily putrefiable, not coagulable by heat or acids, but forming an insoluble compound with lime.—*P.*

Cane Sugar may likewise be obtained from the beet (*Beta Vulgaris*), from onions, turnips, cornstalks, etc. A great amount is prepared by concentrating the sap of the sugar maple (*Acer Saccharinum*). In France considerable quantities are manufactured from the beet. A large quantity is obtained from the sap of the cocoa-nut tree (*Cocos Nucifera*) as well as from other palms growing in India. The Chinese Sugar-plant, *Saccharum Sinense*, as well as the *Sorgho Saccharatum*, yield large quantities.

There are several other saccharine principles, to which a brief reference may be made: 1. *Glucose* or *Grape Sugar*, which is found in grapes, cherries, plums, figs, honey, diabetic urine, and by the action of sulphuric acid upon starch, lactin, gum, or lignin. It has also been found in the liver of different animals. The term "grape Sugar" has been applied to these several Sugars, in consequence of their almost, if not quite, identical characters. If starch, dextrin, gum, diastase, or cellulose, be treated with two or three parts of water acidulated with about one part of sulphuric acid, it becomes changed into glucose; if baryta be added to separate the acid, a clear liquid is left, which deposits crystals of grape Sugar on evaporation. Grape Sugar is not so sweet as cane Sugar, from which it is easily distinguished by the action of acids and bases. Strong sulphuric acid dissolves without charring it, forming sulpho-saccharic acid, and the alkalies or alkaline earths, which do not decompose cane Sugar, unless very concentrated, rapidly convert grape Sugar into a brown matter. It is much less soluble than cane Sugar, requiring one and a half parts of cold water; it dissolves in every proportion in boiling water, is not soluble in absolute alcohol, but soluble in ordinary alcohol. It undergoes no loss by boiling water as is the case with cane Sugar. It is white, odorless, gritty between the teeth, is readily powdered, 2½ parts are required to sweeten as much as 1 part of cane Sugar, and forms in cauliflower-like crystals, and in rhomboidal prisms. With chloride of sodium it forms hard, regular, hexagonal, double pyramidal crystals, colorless, $NaCl + 2\ (C_{12}\ H_{12}\ O_{12}) + 2\ Aq$. Its solution exhibits the prismatic rays with polarized light; when the plane of polarization is rotated from right to left the colors are less brilliant. It softens at 160° F., and at 212° it loses two equivalents of water, and becomes of syrupy consistence, *carpomel*; at a higher heat it forms *caramel.* Like cane Sugar, it possesses right-handed circular polarization. Its sp. gr. is 1.39, and its formula $C_{12}\ H_{14}\ O_{14}$. *Inosit* is a Sugar found in muscle, differing from grape Sugar in containing two more equivalents of water of crystallization.

Uncrystallizable or *Fruit Sugar*, called by Souberain *Chulariose*, is found in sweet fruits and honey, along with grape Sugar; it is likewise obtained by subjecting other Sugars to the action of acids. Long continued boiling of cane Sugar in water will produce it. It does not crystallize, has a very sweet taste, is dissolved in water or alcohol, and wholly parts with its water when heated upon the water-bath, giving, when dried at 212° F., the formula $C_{12}\ H_{12}\ O_{12}$. Its solution in water rotates the plane of polarization to the left. Like the other Sugars it is capable of direct vinous fermentation. (*See Honey, page* 583.)

Sugar of Ergot, $C_{12}\ H_{13}\ O_{13}$, Wigger's mushroom Sugar, procured from ergot of rye; it forms in transparent rhombic prisms, is dissolved by water or alcohol, and is susceptible of the vinous fermentation. Braconnot's mushroom Sugar is mannite. For a description of the other saccharine principles, see *glycerina*, *manna*, and *lactin.*

Sugar, which at present constitutes so important an article in the food of all civilized nations, seems to have been known at a very early period to the inhabitants of India and China. It was used only as a medicine for ages after its introduction into the West. But it was not until after the discovery of America, and the introduction of the Sugarcane into the West Indies by the Spaniards, that its use as an article of food became common. Almost the whole of the Sugar of commerce is produced in the East and West Indies, and some of the Southern States of this country. The Tahiti or Otaheite cane is a thrifty Sugarcane in these States, being quite hardy as a plant, and yielding more Sugar than the ordinary Sugarcane. A new plant has recently been introduced into Europe and this country from northern China, the *Sorgho* or *Holcas Saccharatus;* it grows with great rapidity, does not require irrigation, and yields from sixteen to twenty per cent. of Sugar, from which eight or ten per cent. of pure alcohol can be obtained. The refuse affords an excellent food for cattle.

After the first concretion or crystallization of Sugar from the cane-juice, a thick, dark-brown, slightly empyreumatized syrup is left, called

Molasses or Treacle, *Sacchari Fæx*, or *Sacchari Syrupus Empyreumaticus*. Of this, there are two varieties, called the "Sugar-house molasses," and "West-India molasses." These are viscid, dark-brown, dense liquids, composed of amorphous or uncrystallizable Sugar, crystallizable Sugar, gum, extractive, various salts, and water. They have a sweet taste, the flavor of the Sugar-house, which is the officinal molasses, being much more pleasant than that of the other, and its consistency being also thicker, and increasing slowly under exposure. The West-India molasses in solution with water, allowed to ferment, and then distilled, affords rum. The sp. gr. of the officinal molasses is about 1.400.

The grains obtained by the first crystallization of Sugar from the juice of the cane, forms the brown Sugar, raw Sugar, or muscovado of commerce, *Saccharum Commune* or *Saccharum non Purificatum;* and, when purified, by elutriation with water, solution in water heated by steam, clarification with blood and alumina, filtration through animal charcoal, concentration in vacuo, crystallization, and displacement of the impure syrup in the crystalline mass by passing pure syrup through it, this constitutes the white, loaf, or refined Sugar, *Saccharum Purum*. Several other methods for refining Sugar are also pursued by sugar-refiners. *Raw Sugar*, of good quality, is in small shining grains, which are short, broken, four-sided prisms varying in color from very pale yellowish-gray, to rather deep yellowish-brown, dry when recent, but afterward somewhat clammy, of a purely sweet taste, and of a feeble honey-like odor.

Pure Sugar is usually prepared in compact, crystalline, conical loaves, which are snow-white, dry, easily pulverizable, of an intense sweet taste, without any aroma, are not altered by exposure to the atmosphere, and exhibit a strong phosphorescence when two pieces are rubbed together; their specific gravity is from 1.5629 to 1.6065. It crystallizes in oblique, four-sided prisms, terminated by two converging planes, or in derived figures, in which form it contains 5.3 per cent. of water of crystallization. Solid Sugar melts at a heat of 350° or 360°, and solidifies on cooling into *Barley Sugar*, which is at first amorphous, and vitreous, but subsequently becomes crystalline and opaque; but crystallization may be prevented by the addition of a little tartaric acid or cream of tartar. The sp. gr. of barley Sugar is 1.505. Increased heat renders it viscous without giving any color to it; at 392° it is decomposed, giving off aqueous vapor and forming a brown substance, which gradually, exposed to 430°, becomes black and hygroscopic, having the formula of $C_{12}\ H_9\ O_9$. A sudden application of the heat, converts the Sugar into caramel, water, acetic and formic acids. Distilled with three parts of lime, Sugar yields a clear and colorless volatile liquid, of sp. gr. 0.7921, which has a peculiar smell and a pungent taste, and is miscible in all proportions with water, alcohol, or ether, called *acetone* $C_3\ H_3\ O$; also, another colorless oily liquid, of an agreeable odor, boiling at 183°, and insoluble in water, *metacetone*, $C_6\ H_5\ O$. Cane Sugar differs from fruit Sugar, in its solution rotating the plane of polarization to the right, and in producing with acids a Sugar which polarizes from right to left.

Cane Sugar is soluble in about its own weight of water at 48°, and when the water is nearly at the boiling point, it is capable of dissolving any quantity of Sugar. Water thus saturated with Sugar is called syrup, *Syrupus Simplex;* it is a dense and very adhesive fluid, and when spread thin upon paper, it soon dries, and forms a kind of varnish, which is easily removed by water. Sugar is also soluble in twelve parts of rectified spirit and eighty parts of alcohol; it unites readily with oils, and renders them miscible with water, forming with the volatile oils, *oleum-saccharum.* Strong acids alter Sugar; concentrated sulphuric or muriatic acid blackens it, and causes it to deposit a charry matter on the addition of water; these acids when diluted, convert it successively into grape Sugar, uncrystallizable Sugar, ulmic acid and formic acid. Nitric acid generates successively saccharic, oxalic, and carbonic acids; so that fifty-eight grains of oxalic acid may be procured from one hundred grains of Sugar. Chlorine converts Sugar into saccharic acid. Oxalic, tartaric, citric, malic, and acetic acids, prevent Sugar from crystallizing from its watery solution, effecting changes in it similar to those resulting from the action of mineral acids. Sugar combines with alkalies, losing its sweet taste, and producing compounds which make it more permanent in its character. E. Maumene has found that cane Sugar spontaneously changes into uncrystallizable Sugar, when kept for a long time in solution. The formula of cane Sugar is $C_{12}H_9O_9+2HO$, or $C_{12}H_{11}O_{11}$.

The tests for the detection of Sugar in urine are as follows: 1. Mix together equal parts of solution of neutral chromate of potassa and liquor potassa, and label "*Test for Sugar.*" As this does not test cane Sugar, use the following: (in grape Sugar the green color is more or less intense with the above test, according to the proportion of Sugar present); add together equal parts of solution of bichromate of potassa and liquor potassa. The color with this last is also green on boiling, but the saccharine fluid must be thick and syrupy. To use these test-fluids, place some urine in a white evaporating dish, or a test-tube, add a small quantity of the test and boil, when, if Sugar be present, a sap-green color will be produced from the decomposition of chromic acid; the reduced oxide of chromium is held in suspension by the potassa.—*Jno. Horsley.*

2. M. Luton's easily-prepared and unchangeable "test for Sugar," acts at once without any previous preparation of the urine, and succeeds in cases where the ordinary tests act slowly and obscurely. Its action is not disturbed by the presence of albumen, urea, or uric acid. To prepare it, add an excess of sulphuric acid to a cold saturated solution of bichromate of potassa, in such a manner that some free sulphuric acid will be present when all the chromic acid is liberated. The liquid will be of a beautiful, limpid, red color, and is composed of water, chromic acid, bisulphate of potassa, and an excess of sulphuric acid. *To use it,* add enough of it to

the suspected urine to impart a red color to it, then warm the mixture; a brisk effervescence ensues, and the color changes from red to emerald-green, if Sugar be present. Chromic acid is an active oxidizing agent, particularly in the presence of another acid; it gives up some of its oxygen to the Sugar, and the result is carbonic acid, water, and sesquioxide of chrome, this last dissolves in the free sulphuric acid and forms the persulphate of this sesquioxide.

3. Saturate a strip of white merino in a strong solution of tin, and dry it. A few drops of a very dilute saccharine fluid placed on the merino, and exposed to a temperature of 260° to 300° F. immediately produces a dark-brown or black spot. Linen or cotton will not answer, and care must be taken not to scorch the merino.—*Maumene.*

4. Add a few drops of solution of sulphate of copper to the urine, enough to give it a pale blue tint (a pale blue phosphate of copper may be precipitated); now add an excess of liquor potassa, if Sugar be present, a purplish-blue solution is formed, and if the mixture be carefully boiled for a few minutes, a reddish or yellowish-brown precipitate ensues; if no Sugar, a black one.—*Trommer.*

5. Add to the urine about half its bulk of pure liquor potassa, and boil gently for a few minutes; if Sugar be present, the liquid will assume an orange-brown, or bistre tint.—*Moore.*

6. If a few drops of yeast be added to saccharine urine, at 70° or 80° F., it undergoes vinous fermentation.

7. Saccharine urine when exposed for a few hours to a temperature of 70° F., has a frothy white layer to form on its surface as if flour had been sprinkled on, and which consists of minute torula vesicles, ovoid, or elliptical, articulated or distinct, with granular contents.

8. Dr. Donaldson gives the following simple and easy method for discovering the presence of Sugar in the blood, urine, or bile: Take of crystallized carbonate of soda, and caustic potassa, of each, five parts, bitartrate of potassa six parts, crystallized sulphate of copper four parts, distilled water thirty-two parts; mix together, boil, and filter. A few drops of this solution, thrown into urine or other liquid suspected of being saccharine, and heated over a spirit-lamp, will discover the smallest quantity of Sugar present. After a few minutes application of heat, the liquid acquires first a yellowish-green color, and becomes more and more reddish-yellow, as the proportion of Sugar is more considerable.

9. *Liebig.*—Dissolve a small quantity of oxgall in the suspected fluid in a test-glass, and then rapidly add a quantity of concentrated sulphuric acid equal in amount to that of the fluid in the glass, care being taken to pour it along the side of the glass; if Sugar be present, a beautiful purpurine is immediately produced.

Properties and Uses.—Sugar is nutritive, alterative, demulcent, and topically antiseptic. It belongs to the class of "elements of respiration," contributes to the formation of fat and lactic acid, and by its oxidation furnishes heat. It has been detected in the tissue of the liver. As it is void of nitrogen, it can not sustain life alone, and only becomes eminently nutritive when combined with other alimentary proximate principles. Used in large quantities it is injurious to digestion. In relation to both vegetable and animal matters it acts powerfully in preventing putrefaction; the former of which may be preserved indefinitely in syrup, so long as the syrup is secured against fermentation; while the latter, after long immersion in syrup, or in moistened Sugar, may be perfectly mummefied. On this account it is now used considerably in the preservation of fish, and various meats, instead of salt, to which it is superior, requiring a smaller amount, and not materially affecting the flavor nor the nutritive properties of these meats. Sugar or molasses, when freely eaten by children, prove excellent anthelmintics, and have also proved efficacious in scorbutic affections. Powdered white Sugar is sometimes sprinkled over ulcers to remove fungus or proud-flesh, and has been blown upon the ball of the eye to remove specks on its cornea. As a demulcent, Sugar may be employed in various forms, in cough, hoarseness, soreness of the throat, etc. When taken to the extent of twelve or sixteen ounces per day, dissolved in water, Sugar is said to powerfully increase the sexual passion. It has long been supposed that the teeth are injured or acted upon by Sugar, in a manner calculated to cause their decay, but this opinion is erroneous; if particles of sugar become lodged between the teeth, and are allowed to decompose, decay will inevitably ensue, but if the particles be removed at an early period, Sugar will be found to exert a beneficial influence upon the teeth and gums. The use of it, however, is mainly confined to the preparation of syrups, to conceal the unpleasant taste of several drugs, to render water and oils miscible, to suspend certain medicines in the form of mixture or emulsion, to prevent the oxidation of some chalybeate compound, and also for converting some agents into the state of conserve, confection, electuary, pill, or lozenge. For pills, molasses is most generally preferable to syrup, as it does not so readily harden, and preserves them in a soft, moist state, for a long time, while its antiseptic properties prevent them from becoming moldy.

Sugar in solution absorbs a very large quantity of lime. A *saccharate of lime* has been found very beneficial in the chronic diarrheas of children, as well as to prevent acidity of the stomach, and the disposition to diarrhea so common in children of a certain age at particular seasons. It is made by saturating simple syrup with lime, and then filtering it; it forms a transparent mixture of an extremely alkaline taste, and may be added to water or milk. It is altogether superior to the bicarbonate of soda. Dose for an infant, from a fourth to half a drachm, given in some of the mother's milk; for an adult, from one drachm to two and a half.

A saccharine carbonate of iron and manganese has been recommended by Dr. S. T. Speer, of Cheltenham, England; he finds it to succeed in anemia when iron alone fails, acting promptly and efficiently; it has proved useful in chlorotic anemia, traumatic anemia, etc. It is prepared as follows: Take of finely powdered sulphate of iron three ounces and one drachm, carbonate of soda five ounces, sulphate of manganese one ounce and one scruple; dissolve each of these separately in a pint and a half of water. Then add the solutions and mix them well together; collect the precipitate on a cloth filter, and immediately wash it with cold water; squeeze out as much of the water as possible, and without delay triturate the pulp with finely powdered Sugar two and a half ounces, and dry at a temperature of 120° F. It forms a reddish-brown powder, tasting only of the Sugar, and may be given with the meals, or immediately after, in doses of five grains, gradually increased to one scruple, and repeated three times a day.

Off. Prep.—Confectio Sennæ; Syrupus.

SACCHARUM LACTIS.

Sugar of Milk. Lactin.

Preparation.—When milk has had its butter and cheese removed from it, it is called "whey;" this, evaporated to the consistence of molasses, and when cool, clarified by white of eggs, strained and evaporated, forms Sugar of Milk crystals on cooling. To purify them, redissolve in boiling water, decolorize by animal charcoal, and recrystallize, repeating the process as often as may be necessary.

History.—Sugar of Milk forms in white quadrilateral crystals, which are hard, gritty between the teeth, soluble in five or six parts of water at 60° F., and in two and a half at 212°. They are not dissolved by alcohol or ether, are inodorous, and much less sweet than cane sugar. Sugar of Milk is capable of undergoing vinous fermentation only when an acid has been formed in or added to it. It combines with ammonia and oxide of lead. Its presence prevents the precipitation of many metallic solutions. By boiling with diluted acids it is changed into grape sugar, and nitric acid converts it into saccho-lactic acid. It stands between cane sugar and grape sugar in composition, and has the sp. gr. 1.6. Its formula is $C_{24} H_{24} O_{24}$, or, when anhydrous, $C_{24} H_{19} O_{19}$. It is met with in the form of powder, or in cylindrical pieces of various lengths, and from two to four inches in diameter.

As many concentrated preparations have been presented to the profession, purporting to be pure articles, but which were mere triturations with Sugar of Milk, I will give a mode for detecting them. If the suspected preparation be agitated with absolute alcohol or ether, the *Sugar of Milk* will not be dissolved, but the oil, resin, or coloring matter may be taken up; if it be agitated with six parts of cold water, the sugar will be dissolved, and sometimes the coloring matter will be taken up; but the oil or resin will separate on standing; on the addition of an excess of absolute alcohol to its aqueous solution, the Sugar of Milk falls in a crystalline state. If *cane sugar* be present in the aqueous solution, it will not be precipitated by sub-acetate of lead; it will dissolve in half its weight of cold water, from which it may be precipitated by an excess of absolute alcohol. A small quantity of yeast added to the solution in which cane sugar is present will occasion fermentation, but not if only Sugar of Milk be present. (*See Magnesia and Soda for other tests.*)

Properties and Uses.—Its principal medicinal use is in the trituration of drugs; to aid in rendering them finer and more energetic, as well as to assist in more easily dividing active agents which are to be given in minute doses: thus, if we wish to divide one grain of strychnia into twenty doses, it may be thoroughly triturated with nineteen grains of Sugar of Milk, and one grain of the mixture gives the required dose. Or, one grain of podophyllin, which, in general, is a cathartic dose, by long trituration with ten grains of Sugar of Milk, will form several purgative doses. In these cases, the trituration should always continue for from one hour to one hour and a half. As a medicinal agent, Sugar of Milk is inert.

SAGAPENUM.

Sagapenum.

THE GUM-RESIN OF AN UNCERTAIN PLANT.

History.—Sagapenum is imported from the Levant. It is the solidified juice of an unknown plant, probably of Persian origin. It is commonly in tears agglutinated together, of a brownish-yellow color, a hot and bitter taste, alliaceous odor, softens between the fingers, but does not melt when heated, is sparingly soluble in water, but almost completely soluble in alcohol, and when distilled with water it yields a pale-yellow, very fluid volatile oil, of a strong, alliaceous smell, and a bitter, acrid taste; it is readily soluble in ether and alcohol, and is speedily changed to a transparent resin on exposure to the air.—*T.* Sagapenum contains two resins, one yellowish-brown, insipid, and odorless, insoluble in ether, oil of turpentine, and oil of almonds, soluble in warm liquor potassa and alcohol; the other reddish-yellow, of a bitter, disagreeable taste, an odor like Sagapenum, soluble in alcohol and ether, but little soluble in oils of turpentine and almonds. According to analyses of Brandes and Pelletier, Sagapenum consists of volatile oil, resin, gum, with potash and some salts, mucilage, malate and phosphate of lime, foreign matters and moisture. The volatile oil is pale-yellow, very fluid, lighter than water, has a bitter acrid taste, a garlicky odor, is soluble in alcohol or ether, and is speedily changed into a transparent resin when exposed to the air.

Properties and Uses.—Sagapenum possesses similar medicinal properties with ammoniac and assafetida; but is not so powerful as the last of these. It is sometimes added to discutient plasters as a stimulating ingredient. The dose is from half a scruple to half a drachm.

SAGUS RUMPHII.

Sago.

Nat. Ord.—Palmaceæ. *Sex. Syst.*—Monœcia Hexandria.

THE PREPARED FARINA FROM THE PITH.

Description.—The Sagus Rumphii or *Sago Palm* has an erect *stem*, of middling height, with large, pinnately-divided *leaves*, and prickly *petioles*, rachides and spathes; the prickles scattered or confluent. The *flowers* are polygamo-monœcious on the same spadix. *Spadix* much branched, sheathed by many incomplete spathes. *Amenta* terete. *Calyx* three-cleft; *corolla* tripartite. *Stamens* six; *anthers* affixed by the back. *Fruit* a globose berry, coated by reversed scales, depressed on both sides, one-seeded.

History.—This tree is common to Malacca and the adjacent islands, growing spontaneously in low, swampy lands, and the Sago is obtained from its pith, or spongy medullary substance, of which it contains a large quantity when the tree is sufficiently developed. Several other species of palm are known to produce fine Sago, among which may be named—*Sagus Lœvis* or *Sagus Inermis*, the Unarmed Sago Palm, a native of Borneo and Sumatra, and *Sagueris Rumphii*, abounding in all the eastern isles of the Indian Ocean.

As soon as the palm has arrived at a sufficient degree of maturity it is cut into pieces of five or six feet in length; the woody part is cut off on one side, exposing the pith lying, as it were, in the hollow of a canoe. Cold water is poured in, and the pith well stirred, by which means the starch is separated from the fibrous part and passes through with the water, when the whole is thrown on a sieve. The Sago, thus separated, is allowed to settle; the water is poured off, and, when it is half dry, it is granulated by being forced through a kind of funnel. It is said to acquire its whitish color while dried by artificial heat. One tree alone, of some species, will yield no less than from two to five hundred pounds.

The following description of the several Sagos of commerce is condensed from Pereira:

Sago Meal, or *Flour* is imported in the form of a fine amylaceous powder, whitish, with a buffy or reddish tint, having a feeble, somewhat unpleasant and moldy odor, and presenting a glistening granular appearance under a pocket lens. The microscope shows it to consist of irregularly elliptical or oval, more or less ovate, usually isolated particles, often narrowed or tapered at one extremity, and appearing as if truncated, or more or less mullar-shaped; most of them have an irregular surface as if eroded. Their starch particles measure from .0022 by .0016 of an inch, to .0005 by .0008 of an inch. The hilum, when perfect, is circular; but it cracks in the form of a single slit, or of a cross, or in a stellate manner. The surfaces present the appearance of a series of concentric rings or annular lines, less distinct, however, than in the potato starch, and which lines are indicative of the concentric layers of which each particle is composed. Under the polarizing microscope, the particles show a black cross, the center of which is the hilum.

Common or *Brown Sago* occurs in irregularly rounded or globular masses or grains, whitish on one side, and grayish-brown on the other. Under the microscope, these grains are found to consist of starch particles like those of Sago meal, but more broken, and less regular in their shape. Their size varies from .0026 by .00155 of an inch to .00075 by .0006 of an inch.

Pearl Sago occurs in pearl-like grains, which vary in size from that of poppy seeds to that of white mustard seeds, or even larger. The grains are more or less globular, and of various colors, being white, brownish-yellow, pink, or roseate, and the tint is not uniform over their whole surface; the colored kinds can be made perfectly white by a solution of chloride of lime. Under the microscope it is found to consist of particles like those of Sago meal, but all more or less ruptured, and presenting indistinct traces of rings, and which are doubtless produced by the process of granulation. The starch particles of Pearl Sago measure from .0031 by .0019 of an inch, to .0008 by .00075 of an inch.

Of these varieties the Pearl Sago is more commonly used in this country, the others being rarely met with. Sago possesses the general characters of starch. Sago meal is insoluble in cold water; but by boiling water, it almost entirely dissolves, and yields a tolerably clear solution. The decoction, when cold, strikes a blue color with tincture of iodine. Pearl Sago swells up in cold water, but does not completely dissolve by boiling, a more or less considerable amount of matter remaining behind. The filtered cold aqueous infusion of some sorts of Pearl Sago, strikes a blue color with tincture of iodine.

A factitious Sago is prepared in France and Germany from potato-starch, of which there are two kinds, one red, and the other brownish. The microscope will detect the factitious from the real sort. (*See potato starch*); many of the potato starch particles, by the influences to which they have been subjected during their metamorphosis into Sago, become swollen, ruptured in the direction of their long axis, and by drying, have shriveled, leaving a long, linear, sometimes curved or even-branched line, with incurved or involute edges, indicating the situation of the rupture.—*P.*

Properties and Uses.—Sago is nutritive and demulcent, and is a convenient and agreeable article for making puddings, gruel and diet drinks for the sick room. It should always be long boiled before it is used. It is not so much used as formerly, being superseded by the purer arrow-root and tapioca. For common uses, half an ounce of Sago may be boiled in a pint of water (in some cases milk is preferred), the solution strained, and flavored with sugar and spices, lemon or even with a little white wine, when there are no contra-indications to their use.

Castillon's Powders, a popular article of diet for invalids, in cases of indigestion, chronic dysentery, etc., is composed of Sago, Salep, Tragacanth, of each, in powder, four drachms, powdered prepared oyster-shells one drachm. These are to be well mixed, and divided into twelve powders; sometimes it is colored with a small quantity of cochineal. For use, each powder is to be boiled with a pint of milk; which may be sweetened and flavored to suit the patient's taste.

SALIX ALBA.

Willow.

Nat. Ord.—Salicaceæ. *Sex. Syst.*—Diœcia Diandria.

THE BARK.

Description.—SALIX ALBA, or *White-willow* is a tree from thirty to eighty feet in height, with many round, widely spreading branches, silky when young, and a thick, brown bark, full of cracks; that of the smaller branches smooth and greenish. The *leaves* are alternate, on short petioles, lanceolate, or elliptic-lanceolate, broadest a little above the middle, pointed, tapering toward each end, acutely serrate with the lower serratures glandular; both sides of a grayish, somewhat glaucous, green, beautifully silky, with close-pressed silvery hairs, especially on the under surface, and which is very dense and brilliant on the uppermost, or youngest leaves; the lowermost on each branch, like the bracteas, are smaller, more obtuse, and greener. The *stipules* are variable, either roundish or oblong, small, and often wanting. The *flowers* and leaves appear coincidently. The *aments* are on short stalks, with three or four spreading, leafy bracteas, terminal, cylindrical, and elongated. *Scales* brown, elliptical, lanceolate, pubescent at the margin; those of the barren aments narrower toward the base; of the fertile, dilated and convolute in that part. *Stamens* two, yellow, rather longer than the scales, with one obtuse gland before, and one behind; *filaments* hairy in their lower part. *Anthers* roundish, yellow. *Ovary* very nearly sessile, green, smooth, ovate-lanceolate, bluntish, longer than the scale. *Style* short; *stigmas* short, thick, two-parted, recurved, and nearly sessile. *Capsule* ovate, brown, smooth, rather small.—*L.*—*G.*—*W.*

History.—The White or European Willow is a large tree of rapid growth, native of Europe, and introduced into this country; its flowers appear from March to June. The bark, which is the officinal part, is readily removed from the stem during the months of July, August and September. The dried bark is met with more or less quilled, pliable and tough, with a faint odor, and a bitter taste combined with some astringency. Water takes up its medicinal properties, the decoction having a dark-reddish color, and which is precipitated abundantly by gelatin, carbonates of potassa and ammonia. Lime-water gives at first a blue, and then a buff-colored precipitate. Sesquichloride of iron throws down a dark-green tannate of iron. If the decoction contains much salicin, concentrated sulphuric acid reddens it. It consists, according to Pelletier and Caventou, of bitter yellow coloring-matter, green fatty matter similar to that found in cinchona, tannic acid, resinous extract, gum, wax, woody fiber, and a magnesian salt containing an organic acid. There are numerous species of Salix, many of which undoubtedly possess analogous medicinal virtues; the best rule to follow is, to select those whose barks possess great bitterness combined with astringency. Among those which have been used, are the *S. Alba*, *S. Caprea*, *S. Russelliana*, *S. Purpurea*, and *S. Pentandra*. The Weeping Willow or Babylonian Willow, *Salix Babylonica*, is cultivated as an ornamental tree.

Properties and Uses.—Willow bark is tonic, antiperiodic, and an astringent bitter. It has been given in intermittents, dyspepsia connected with debility of the digestive organs, passive hemorrhages, chronic mucous discharges, in convalescence from acute diseases, and in worms. Although occasionally substituted for the cinchona bark, it is inferior in activity. In chronic diarrhea and dysentery, the tonic and astringent combination of the Willow, renders it very eligible. It may be given in substance, in doses of one drachm of the powder, repeated as indicated; or of the decoction, one or two fluidounces, four or five times a day. The decoction has also proved efficacious as a local application to foul and indolent ulcers.

SALIX NIGRA, *Black*, or *Pussy Willow*, is a tree growing from fifteen to twenty-five feet high, covered with a rough blackish bark, and found on the banks of rivers, especially in New York and Pennsylvania. The *leaves* are narrowly lanceolate, pointed and tapering at each end, serrulate, smooth and green on both sides; petioles and midveins tomentose. The *stipules* are small, deciduous, dentate; *aments* erect, cylindric, villous; *scales* oblong, very villous. *Sterile aments* three inches long; *glands* of the sterile flowers two, large, and deeply two or three cleft. *Stamens* four to six, often but three in the upper scales; *filaments* bearded at base. *Ovary* pedicellate, smooth, ovoid; *style* very short: *stigmas* bifid. The *branches* are pale yellow, and brittle at base, and are much used for the manufacture of baskets and other kinds of wicker-work.—*G.*—*W.* The bark of Black Willow is recommended as a poultice in gangrene, and as an external application to foul and indolent ulcers, in which it stands unrivaled. It is made by simmering the powdered bark in cream. It has also been successfully used in various swellings of the neck. Internally, the root is a bitter tonic, effectual in intermittents. Some have highly recommended it in asthma and gout. A decoction of the Black-Willow buds or aments is useful in gangrene, taken internally, and applied locally; and drank freely it proves a powerful anaphrodisiac, suppressing venereal desires for a long time, and is highly recommended in the treatment of spermatorrhea.

SALICIN.

Salicin.

THE ACTIVE PRINCIPLE OF THE WILLOW.

Preparation.—Several processes are given for the preparation of Salicin. Merck obtained 502 grains from 32 ounces of the bark of *Salix Helix*, by the following mode: Willow bark in small pieces was exhausted by boiling with water; the decoction concentrated, and while boiling litharge was added until the liquid was nearly colorless. The dissolved oxide of lead was removed first by sulphuric acid, afterward by sulphuret of barium, and, after the separation of sulphuret of lead, evaporated, when the Salicin was obtained in crystals. It was afterward purified by repeated solution and crystallization. The oxide of lead removed gum, tannic acid, and extractive from the solution, which would impede the crystallization of the Salicin, and also combined with the Salicin, forming a salt which was decomposed by the sulphuric acid and sulphuret of barium.—*Turner's Chemistry, 7th Ed., p.* 816.

According to Christison, Erdman obtained five drachms of Salicin from sixteen ounces of the bark of *Salix Pentandra*, as follows: The bark was left for twenty-four hours to macerate in milk of lime consisting of two ounces of lime in four quarts of water; after which the mixture is boiled for half an hour. This step is repeated twice with the residue. The decoctions being cleared by subsidence, and concentrated to a quart, the remaining liquid is digested with eight ounces of ivory black, filtered, and evaporated to dryness. The extract, in powder, is then exhausted with spirit containing 28 per cent. of alcohol, the spirit is distilled off, and the crystals which subsequently form are purified by a second crystallization after being treated with ivory black.

Fisher and Tyson's plan is as follows: Boil willow bark with caustic lime in water; then filter the decoction, and add sulphate of zinc as long as any precipitate is produced. Again filter the liquid, evaporate to the consistence of an extract, and treat this with alcohol. Carefully evaporate the tincture thus made, when Salicin will form in crystals; these may be purified by washing with a saturated solution of the same principle in cold water.

History.—Salicin, $C_{26}H_{18}O_{14}$, crystallizes in silky needles and laminæ. It is white, very bitter, odorless, neutral to vegetable colors, fusible at 230° F., and combustible at a higher temperature. It is soluble in seventeen parts of water at 66°, and in every proportion in boiling water. It is soluble in alcohol, but not in ether or the volatile oils. Concentrated sulphuric acid reddens it, forming *rutilin.* Three parts, each, of Salicin and bichromate of potassa, and twenty-four parts of water, dissolved together, to which are to be added oil of vitriol four and a half parts in twelve of water, will, when heat is applied, yield a volatile, almost colorless oil, having the odor of the flowers of meadow sweet, with a sharp, burning taste, leaving a white spot upon the tongue, and not easily soluble in water; this is *salicylous acid*, $C_{14} H_5 O_4$, of sp. gr. 1.1731, and if it be heated with an excess of hydrate of potassa, *salicylic acid* $C_{14} H_5 O_5$ is obtained under evolution of hydrogen gas. Chlorine converts Salicin into grape sugar and *saligenin;* the same result occurs by the fermentation of Salicin. Saligenin boiled with a diluted acid, or heated beyond its melting point, is changed into a white, tasteless, insoluble resinous powder named *Saliretin*, $C_{14} H_6 O_2$.

Salicin rotates to the left a ray of plane polarized light. If a small portion be placed in the center of a glass slide, and this be held over an alcohol lamp, removing it and immediately pressing upon it a thin glass cover as soon as fusion of the Salicin commences, it will exhibit a most gorgeous display of colors under the polarizing apparatus.

Properties and Uses.—Salicin is topic, antiperiodic, and febrifuge; and may be used as a substitute for quinia, to which, however, it is slightly inferior. It is, however, less likely to irritate the stomach and excite the nervous system, for which properties it may be administered in cases where cinchonism would be produced by the exhibition of quinia. It is often employed to adulterate quinia with, and may be detected by sulphuric acid, which will turn the Salicin red, even in minute quantity. The dose of Salicin is from two to ten grains, to be repeated three or four times a day; three doses of six grains each, have been known to cut short intermittent fevers in one day. In its passage through the system, Salicin undergoes oxidation, and is converted into salicylous acid, which is found in the urine; its presence is detected by a persalt of iron, which strikes an intense violet color with urine containing it.

Off. Prep.—Salicin; Quiniæ et Saliciniæ Tartras.

SALVIA OFFICINALIS.

Sage.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES.

Description.—Salvia Officinalis, or *Garden Sage*, is a plant with a pubescent, four-sided *stem*, with erect *branches*, hoary with down, leafy at the base, those bearing flowers a foot or a foot and a half long, tomentose. The *leaves* are opposite, entire, petioled, ovate-lanceolate, crenulate, rugose, the lowermost white with wool beneath. The *flowers* are blue, in whorls, and in long, terminal, nearly simple racemes; *whorls* few-flowered, distinct; *floral leaves* or *bracts* sessile, ovate, acuminate, membranous, and striated at the base. The *calyx* is campanulate, membranous, colored, striated downy, and bilabiate; the upper lip is three-toothed, the lower bifid; all the teeth subulate, acuminate. The *corolla* is two or three times as long as the calyx, with a large projecting tube, ringed in the inside, and bilabiate; the upper lip is arched, and the lower one trilobed, the lateral lobes being reflexed. The *stamens* are affixed to short pedicels transversely about their middle.—*L.*—*W.*

History.—Sage is a native of Southern Europe, and has been naturalized in this country as a garden plant; the leaves and tops should be gathered and carefully dried during its flowering season, which is in June and July. They have a peculiar, strong, aromatic, camphorous odor, and a sharp, warm, slightly bitter taste, which properties are owing to its volatile oil. This oil may be obtained by distilling the plant with water; when old it is always a mixture of camphor $C_{18}H_{15}O_2$ with $C_{12}H_{10}O$. It imparts its virtues to boiling water in infusion, but more readily to alcohol. The infusion becomes black on the addition of sulphate of iron. Numerous other species have similar properties, as the *S. Sclarea* or *Clarry*, a native of Southern Europe, which is said to be antispasmodic and balsamic. Also the *S. Horminum*, *S. Bengalensis* of India, *S. Pomifera* of Greece, etc.

Properties and Uses.—Sage is feebly tonic and astringent, expectorant, diaphoretic, and having properties common to aromatics. An infusion is beneficial in flatulence connected with gastric debility, and will, it is stated, prove efficacious in restraining the exhausting sweats of hectic fever; it may likewise be used warm, as an anthelmintic, and for the purpose of causing diaphoresis in some febrile diseases. The warm infusion will cause active diuresis by checking its diaphoretic tendency. Dr. James Anton, of Georgia, considers it an excellent remedy for spermatorrhea; also a valuable antiphrodisiac to check excessive venereal desires. It may be used in connection with moral, hygienic, and other aids, if necessary. Van Swieten states that a vinous infusion forms an excellent fomentation to the breasts of nurses, when it is desirable to check the flow of milk. The infusion is much used as a gargle for inflammation and ulceration of the throat, and relaxed uvula, either alone or combined with vinegar, honey, alum, or sumach berries. The oil may be used in small doses as a carminative and stimulant; and externally, applied with friction in rheumatism. Dose of the infusion, from two to four fluidounces, three or four times a day; of the powdered leaves, twenty to thirty grains.

SALVIA LYRATA, variously named *Wild* or *Meadow Sage*, *Lyre-leaved Sage*, or *Cancer-Weed*, is a perennial plant, growing from Canada to Florida in shady woods and meadows, and flowering in May and June. It has an erect, quadrangular, nearly leafless *stem*, one or two feet high, branching above and covered with hairs pointing downward. The *radical leaves* are obovate, lyre-shaped or sinuate-pinnatifid, sometimes almost entire, and petiolate; the *cauline leaves* mostly, but one or two pairs, just below the raceme, smaller and narrower than the radical. The *flowers* are blue, in loose and distant whorls of about six, forming a long, interrupted raceme; *bracts* oblong-linear, not longer than the calyx. The *upper lip* of the blue-purple pubescent corolla, short, straight, not vaulted; the *tube* much exserted.—*W.*—*G.* The fresh radical leaves will, it is positively asserted, when bruised, and applied to warts, generally destroy them; the application to be continued for a day or two, and renewed every twelve hours. It is also reputed to have cured cancers.

Off. Prep.—Infusum Salviæ Compositum.

SAMBUCUS CANADENSIS.

Elder.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE FLOWERS AND BERRIES.

Description.—Sambucus Canadensis is a common well-known native plant, from five to twelve feet high, with a shrubby *stem*, filled with a light and porous pith, especially when young. The *bark* is rather scabrous and cinereous. The *leaves* are nearly bipinnate, antiposed; the *leaflets* in three or four pairs with an odd one, oblong-oval, acuminate, smooth, serrate, the lower ones often two or three parted. *Petioles* smooth. The *flowers* are numerous, white, in very large level-topped, five-parted cymes, and have a heavy odor. *Calyx* small, five-parted; *corolla* five-cleft, segments obtuse; *stamens* five; *stigma* obtuse, small, sessile. The *fruit* consists of numerous purplish-black berries.—*W.*

SAMBUCUS NIGRA or *European Elder*, is much larger than the preceding. The *stem* is much and irregularly, though always oppositely branched, and of quick growth; after a year's growth the branches become filled with a light spongy pith, and covered with a smooth gray bark. The bark of the stem is rough and whitish. The *leaves* consist of usually two pairs of smooth, deep-green leaflets, with an odd one, all smooth, ovate-lanceolate, serrate. The *flowers* are numerous, cream-colored, in large, smooth, five-partite cymes, with a sweet but faint smell; some in each cyme sessile. *Calyx* five-cleft; *corolla* rotate, five-cleft; lobes obtuse. The *fruit* is a globular, purplish-black berry, having reddish stalks.—*L.*—*De Cand.*

History.—Sambucus Canadensis is an indigenous shrub growing in all parts of the United States, in low damp grounds, thickets, and waste places, flowering in June and July, and maturing its berries in September and October. *S. Nigra* is indigenous to Europe, growing in situations similar to those of the American variety. The two plants possess similar medical properties. The officinal parts are the flowers, the berries and the inner bark.

The odor of the *flowers* is characteristic and heavy, quite powerful when fresh, but faint when dried; they are slightly aromatic and bitterish, and impart their virtues to hot water. Boiling dissipates a volatile oil, which may be obtained by distillation with water; when cold it has the consistence of butter. Ammonia is present in water which has been distilled from the flowers, and to which they probably owe some of their medicinal properties. Elder flowers contain volatile oil, acrid resin, tannic cid, malates of potassa and lime, mineral salts, a trace of sulphur, etc.

The *berries* have little or no odor, an acid-saccharine taste, and yield by expression a purple juice, called *Elder-rob*, which gives a dark-lilac color with alkalies, and a scarlet with acids; acetate of lead added to the juice causes a blue deposit of its coloring substance. It contains malic acid, a little citric acid, sugar, and coloring matter.

The *inner bark* is whitish, with a green tint, odorless, of a saccharine taste, but subsequently bitterish, with some acrimony, and imparts its properties to water or alcohol. Simon states that the active principle of the bark is a soft uncrystallizable resin, and which may be obtained by treating an evaporated, syrup-like alcoholic tincture with ether which takes up the resin; filter, and make into an extract by evaporation. Twenty grains produced vomiting four or five times, and as many stools. Kramer found the bark to contain valerianic acid, volatile oil in trace, albumen, tannic acid, an acid sulphurous fatty matter, resin, gum, wax, grape sugar, chlorophyll, pectin, starch, various salts, etc.—*Chem. Gaz. May*, 1846.

Properties and Uses.—In warm infusion the *flowers* are diaphoretic, and gently stimulant; in cold infusion they are diuretic, alterative, and cooling, and may be used in all diseases requiring such action, as in hepatic derangements of children, erysipelas, erysipelatous diseases, etc. In infusion with maidenhair and beech-drops, they will be found very valuable in all erysipelatous diseases. The *expressed juice of the berries*, evaporated to the consistence of a syrup, is a valuable aperient and alterative; one ounce of it will purge. An infusion of the young leaf-buds are likewise purgative, and sometimes act with violence. The flowers and expressed juice of the berries have been beneficially employed in scrofula, cutaneous diseases, syphilis, rheumatism, etc. The *inner green bark* is cathartic; an infusion of it in wine, or the expressed juice will purge moderately, in doses of from half a fluidounce to a fluidounce; large doses produce emesis; in smaller ones it proves an efficacious deobstruent, promoting all the fluid secretions, and is much used in dropsy, especially that following scarlatina, and other febrile and exanthematous diseases, as well as in many chronic diseases. Beaten up with lard or cream, it forms an excellent discutient ointment, and which is of much value in burns, scalds, and some cutaneous diseases. The juice of the root in half-ounce doses, daily, acts as a hydragogue cathartic and diuretic, and will be found valuable in all dropsical affections. The inner bark of Sambucus Nigra is hydragogue and emeto-cathartic. It has been successfully used in epilepsy by taking it from branches one or two years old, scraping off the gray outer bark, and steeping two ounces of it in five ounces of cold or hot water for forty-eight hours. Strain, and give a wineglassful every fifteen minutes when the fit is threatening; the patient fasting. Resume it every six or eight days.

Off. Prep.—Aqua Sambuci; Syrupus Sarsaparillæ Compositus; Unguentum Sambuci; Vinum Sambuci.

SANGUINARIA CANADENSIS.

Bloodroot.

Nat. Ord.—Papaveraceæ. *Sex. Syst.*—Polyandria Monogynia.

THE ROOT.

Description.—Bloodroot, or *Red Puccoon*, as it is sometimes called, is a smooth, herbaceous, perennial, indigenous plant, with a horizontal, truncate or premorse, creeping *root*, covered with scattered fibers, and emitting an acrid bright orange-colored juice when cut or bruised. It is frequently crooked, two or three inches long, from three to six lines in diameter, brownish-red externally, and red internally. From each bud of the root-stalk there springs a single leaf, and a round, erect *scape* about six inches high, with a single flower; and as they arise, the folded leaf incloses the flower-bud, and rolls back as the latter amplifies. The *leaf* is smooth, on long, channeled petioles, reniform or cordate, with large roundish lobes separated by rounded sinuses; the under side strongly reticulated by orange-colored veins, paler than the upper, and at length glaucous. The *flower* is white, scentless, of a quadrangular outline, and of short duration. The *calyx* formed of two concave, ovate, obtuse sepals, falling off when the corolla expands: the *corolla* is composed of eight (or more, by cultivation) petals, which are spreading, concave, obtuse, the external ones longer; sometimes they have a purple or rose tint. *Stamens* short, numerous, with oblong, yellow *anthers*. *Ovary* oblong, compressed, *style none; stigma* thick, somewhat two-lobed. *Capsule* oblong, acute at both extremities, two-valved. *Seeds* numerous, roundish, compressed, dark shining red, half-surrounded by a white vermiform raphe.—*L.*—*W.*—*B.*

History.—Bloodroot is found growing throughout the United States in shaded woods, groves, rich soils, etc., presenting very elegant but odorless flowers from March to June. The dried root is the officinal part, although the whole plant is actively medicinal. As found in the shops, the root is dark-brown externally, yellow internally, but becoming dark-brown by the action of the air, more or less crooked, compressed, corrugated, diminished in size, having a short, pithy-like fracture, a faintly virose odor, and a bitter acrid, and pungent taste, leaving an impression in the fauces for some time after it has been chewed. It is readily reduced to a grayish-red powder. Boiling water or alcohol takes up its active properties. The root has not been analyzed; it should be kept in a dry place; age or moisture impairs its activity. An alkaloid and resinoid are prepared from the root, the former termed *Sanguinarina*, the latter *Sanguinarin.*

Properties and Uses.—The actions of Bloodroot are various according to the manner in which it is administered; in small doses it stimulates the digestive organs, and increases the action of the heart and arteries, acting as a stimulant and tonic; in larger doses it acts as a sedative to the heart, reducing the pulse, causing nausea, and consequently diaphoresis, increased expectoration, and gentle diuresis, at the same time stimulating the liver to increased action; in still larger doses it causes severe vomiting, with distressing gastralgia, and symptoms of narcosis; death has ensued from large doses. The powder excites sneezing when introduced into the nostrils, stimulating the nasal membrane for some time. It has been successfully used in bronchitis, laryngitis, hooping-cough, and other affections of the respiratory organs, as a nauseant, or, combined with other agents, as an emetic; also in dyspepsia as a stimulant-tonic, and as an alterative in jaundice and rheumatism. In torpid conditions of the liver it is very valuable, and it has also proved beneficial in scrofula, amenorrhea, and dysentery. Used as a snuff, either alone or combined with bayberry bark, it is beneficial in coryza, some headaches, and is recommended as a remedy for nasal polypus. Applied to fungous growths, indolent and ill-conditioned ulcers, and fleshy excrescences, the powder often proves of utility, removing the fungous growth by its escharotic action, and creating a new and healthy energy in the ulcers. An infusion made in vinegar has been found valuable in several obstinate cutaneous diseases, tetter, ringworm, and warts. Dose of the powder, as an emetic, from ten to twenty grains; of the tincture, from twenty to sixty drops; as a stimulant or expectorant, from three to five grains; as an alterative, from half a grain to two grains. It may be used in powder, pills, tincture, or extract.

Off. Prep.—Acetum Sanguinariæ; Extractum Sanguinariæ Hydroalcoholicum; Mistura Sanguinariæ Composita; Pilulæ Taraxaci Compositæ; Pulvis Ipecacuanhæ Compositus; Pulvis Lobeliæ Compositus; Pulvis Myricæ Compositus; Sanguinarin; Sanguinarina; Tinctura Lobeliæ Composita; Tinctura Sanguinariæ; Tinctura Sanguinariæ Acetata; Tinctura Sanguinariæ Composita; Tinctura Viburni Composita.

SANGUINARINA.

Sanguinarina.

THE ALKALOID PRINCIPLE OF BLOODROOT.

Preparation.—Digest *six ounces* of finely powdered Bloodroot in *twelve ounces* of Diluted Muriatic or Acetic Acid; at the expiration of ten days, filter, and add to the filtered tincture *two and a half ounces* of Aqua Ammonia, and pour the mixture into a vessel containing two pints of distilled water; filter and collect the brown matter which subsides, and carefully wash it with a small quantity of distilled water, and remove the coloring by means of animal charcoal. Then treat it with boiling alcohol, which dissolves the Sanguinarina, and cautiously evaporate.

Prof. E. S. Wayne recommends the following mode of obtaining sulphate of Sanguinarina, which is Dr. Shiel's process: Exhaust Bloodroot in coarse powder, in a percolator, with dilute Sulphuric Acid, and then add Ammonia, a deep purple precipitate occurs, which must be washed with water upon the filter, dried, and treated with ether, which dissolves out the Sanguinarina. Treat this solution with animal charcoal, and the alkaloid is obtained as a sulphate of a bright vermillion color, on the addition of a solution of sulphuric acid in ether.—*Am. Jour. Pharm., CXXV., p.* 521.

History.—Pure Sanguinarina is a white or pearl-gray body, having a bitter taste with some acrimony, is hardly dissolved by water, but readily by ether or alcohol, and possesses well-marked alkaline characters, rendering turmeric paper brown or red, and forming red colored salts with the acids. Scheele gives its formula $C_{37}\ H_{16}\ NO_8$.

Prof. E. S. Wayne has discovered a new principle in bloodroot, obtained from the ethereal solution above named; after all the Sanguinarina has been removed. It is in bright red acicular crystals, soluble in acids, from which alkalies precipitate it unaltered.

Properties and Uses.—Same as the bloodroot. One grain of this alkaloid may be thoroughly triturated with twenty or thirty grains of sugar of milk, and divided into ten or thirty doses, according to the effect desired. However, it is not much used in practice, the *Sanguinarin* being preferred.

SANGUINARIN.

Sanguinarin.

THE ALKA-RESINOID PRINCIPLE OF BLOODROOT.

Preparation.—Take of coarsely pulverized Bloodroot, any quantity, Alcohol a sufficient quantity to make a saturated tincture. When made, filter the tincture and add Distilled Water equal in quantity to that of the alcohol; distill off the alcohol, and allow the residue to rest for several days, or until precipitation ceases. Remove the supernatant liquid, wash the precipitate in a fresh supply of distilled water, dry it carefully by a moderate heat, and pulverize for use. As thus prepared it consists of a portion of the alkaloid *Sanguinarina* in combination with the *Sanguinarin*, and which is generally sold and used under the name of *Sanguinarin.*

History.—As thus prepared, Sanguinarin is of a deep reddish-brown color, a peculiar odor, of a bitterish, rather nauseous taste, followed by a sense of pungency in the fauces, which is persistent, soluble in boiling alcohol, insoluble in water, and does not coalesce, unless it is heated or exposed to moisture. It is fusible, forming a black shining mass, and is also inflammable. It is partially soluble in alkaline solutions, acetic acid, and ether.

Properties and Uses.—This article is prepared by W. S. Merrell, and is an elegant and valuable, as well as important medical agent. It possesses properties similar to bloodroot, and acts as a tonic, hepatic, and alterative. One or two grains, repeated every two hours, diminishes the velocity of the pulse in from eight to twelve hours; after which it only requires a small dose two or three times a day, to maintain its influence; and in effecting this sedative action on the arterial system, it does not produce any unfavorable cerebral results. It may be employed with advantage in the treatment of pulmonary diseases, influenza, hooping-cough, rheumatism, jaundice, etc. In combination with leptandrin and podophyllin it forms a medicine, which for safety and efficacy in the treatment of hepatic diseases is superior to any other remedies yet known in medicine; the combination may be formed into pills with extract of rhubarb, hydro-alcoholic extract of cimicifuga, or of bitter root. Combined with equal parts of caulophyllin, and hydro-alcoholic extract of cimicifuga, it will be found very efficacious in amenorrhea, dysmenorrhea, and other functional disorders of the female generative system. It may also be used as a sternutatory, and as a local application to indolent ulcers. When used alone it should be triturated with sugar, sugar of milk, or some other article. As a tonic, the dose is from one-fourth of a grain to a grain, three or four times a day; as a hepatic and alterative, from one-half of a grain to two grains.

SANGUIS DRACONIS.

Dragon's Blood.

RESIN OF CALAMUS DRACO.

Description.—Calamus Draco is a small palm growing in the islands of the Indian Archipelago. While the plants are young, the *trunk* is erect, and resembles an elegant, slender palm tree, armed with innumerable dark-colored, flattened elastic spines, often disposed in oblique rows, with their bases united. By age they become scandent, and overrun trees to a great extent. The *leaves* are pinnate, their sheaths and petioles armed as above described. The *leaflets* are single, alternate, ensiform, margins remotely armed with stiff, slender bristles, as are also the ribs; from twelve to eighteen inches long and about three-fourths of an inch broad. *Spadix* of the female hermaphrodite inserted by means of a short, armed petiole on the mouth of the sheath opposite to the leaf, oblong, decompound, resembling a common oblong panicle. *Spathes* several, one to each of the four or five primary ramifications of the spadix, lanceolate, leathery; all smooth except the exterior or lower one which is armed on the outside. *Calyx* turbinate, ribbed, mouth three-toothed, by the swelling of the ovary split into three portions, and in this manner adhering, together with the corolla, to the ripe berries. *Corolla* three-cleft; divisions ovate-lanceolate, twice as long as the calyx, permanent. *Filaments* six, very broad, and inserted into the base of the corolla. *Anthers* filiform, and seemingly abortive. *Ovary* oval; *style* short; *stigma* three-cleft;

divisions revolute, glandular on the inside. *Berry* round, pointed, of the size of a cherry.—*L.*—*Roxb.*

History.—Dragon's Blood is a dark-red substance, which is imported from the East Indies, and which is procured from the berries of the C. Draco, by rubbing or agitating them in a bag, softening the resinous exudation obtained by heat and making these up into masses. It is also had from several other palms. There are several sorts of it; one, occuring in dark reddish-brown sticks, a foot or more in length, and from three to six lines in diameter, enveloped with palm leaves, and bound with narrow slips of cane; another occurs in reddish-brown lumps of the size and shape of an olive, also covered with leaves in a moniliform row; another, of very fine quality, is a reddish powder; a fourth occurs in large irregular pieces or tears, while an inferior kind is in very large masses or lumps, presenting a heterogeneous fracture.—*P.* Dragon's Blood is brittle, tasteless, and odorless. It is not acted upon by water, but is almost all dissolved by alcohol. It also forms solutions with oils and ether. It fuses by heat, and emits a benzoic-acid-like fume on burning. Its solution stains marble a fine deep-red color, and the hotter the marble the deeper the stain penetrates. Herberger found it to be composed of 2.0 fixed oil, 90.7 red resin, which he called *draconin*, and considered a weak acid, 3.0 benzoic acid, 1.6 oxalate of lime, 3.7 phosphate of lime.—*T.*

Properties and Uses.—Dragon's Blood was formerly considered an astringent, and used in doses of from ten to thirty grains in passive hemorrhages, diarrhea, etc. Its principal use is to color tooth-powders, plasters, tinctures and varnishes. It is an ingredient of the following preparation, which, whether deservedly or not, has acquired much reputation in the treatment of syphilis: Take of Dragon's blood and colocynth, of each, two drachms, gamboge half an ounce, sweet spirits of nitre and balsam copaiba, of each, two ounces. Mix the first three articles in a mortar, and then add to them three gills of boiling water; keep it hot, and stir for one hour, then cool, and after uniting the last two, add them to the first mixture, stirring for some time. The dose is a half-ounce to produce free catharsis; after which, a drachm, two or three times a day, to keep up a gentle action on the bowels. Notwithstanding the character of this compound, it is said to have effected cures in very severe forms of the disease.

SANICULA MARILANDICA.

Sanicle.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—Sanicle is an indigenous, perennial herb, sometimes known by the name of *Blacksnake Root*, with a *stem* from one to three feet high, smooth, furrowed, and dichotomously branched. The *leaves* are from three to five parted, digitate, mostly radical, on petioles from six to twelve inches long; *segments* from two to four inches long, half as wide, oblong, irregularly and mucronately toothed. *Cauline leaves* few, nearly sessile. The *flowers* are mostly barren, white, sometimes yellowish; the sterile flowers on slender pedicels; the fertile ones sessile. *Segments of the calyx* entire. *Involucres* six-leaved, serrate. *Umbels* often proliferous; *umbellets* capitate. *Fruits* several in each umbellet, and densely clothed with hooked bristles.—*W.*—*G.*

History.—Sanicle is common to the United States and Canada, and is found in low woods and thickets, flowering in June. The fibrous root is the officinal part; its taste and odor is somewhat aromatic. Water or alcohol extracts its properties.

Properties and Uses.—Sanicle very much resembles valerian in its action on the system, possessing nervine and feebly anodyne properties, together with some astringency. It has been used with advantage as a domestic remedy in intermittent fever, sore-throat, cynanche trachealis, erysipelas, and some cutaneous diseases. It is very efficacious in chorea, in doses of half a drachm of the powdered root, three times a day, to children eight or ten years of age. It has also been beneficially employed in various other nervous affections. The decoction of it is said to be valuable in gonorrhea, dysentery, passive hemorrhages, and leucorrhea, administered in doses of from two to four fluidounces, and repeated three or four times a day. The decoction used freely, at the same time bathing the wound with it, is reputed a certain cure for the bites of poisonous snakes.

SAPO.

Soap.

Soap is an artificial product, being the result of an union of one or more fatty acids with a salifiable oxi-base. The common soaps are true salts, or stearates, margarates, or oleates of ammonia, potassa or soda, and are soluble in water; while those soaps which are formed by the combination of fatty acids with metallic oxides, as for instance the oxide of lead soap or lead-plaster, are insoluble in water, but soluble in fat oils and oil of turpentine. Fatty substances and oils are composed of two solid constituents and one fluid. Of the former, one is termed *Stearin*, or *Stearinate of Glycyl*, and is the chief ingredient of the hard fats, as beef and mutton suet, butter of cocoa, etc.; the other is called *Margarin*, or *Margarinate of Glycyl*, being more common in the soft fats, as lard, etc.; and the fluid *Olein*, or *Oleinate of Glycyl*, is the principal constituent of the liquid fats or oils. (*See Adeps, Lard.*)

Stearin is a combination of stearic acid and glycerin, or the oxide of glycyl. *Stearic Acid* is obtained by the saponification of mutton suet with potassa, dissolving the soap formed in six parts of boiling water, decomposing the solution by hydro-chloric acid, when a mixture of stearic and oleic acids rises to the surface. This mixture is strongly pressed between warm plates so long as any oleic acid flows out; the residue is impure stearic acid, which may be purified by solution in boiling alcohol and crystallization, repeated till its melting point is constant at 167° F. Stearic acid is a white solid body, which melts at 167° F., having the sp. gr. 0.854 when in the fused state; on cooling it crystallizes in large, shining scales, or in brilliant needles. It may be reduced to powder, is not dissolved by water, but is by alcohol or ether, especially when these are at the boiling point, and burns like wax with a clear flame, on which account it is used in the formation of improved candles. Its formula is $C_{68} H_{66} O_5$ 2HO.

Margarin is a combination of margaric acid and glycerin. *Margaric acid* is found in large quantity in human fat, lard, linseed and olive oils, butter, etc. It is best procured from olive oil, by saponifying it with potassa, and decomposing a watery solution of the soap with acetate of lead. The deposit, which is composed of margarate and oleate of lead, is dried, and treated several times with boiling ether, which takes up the oleate of lead. An acid is added to the remaining margarate of lead, which separates the lead from the margaric acid, and the margaric acid deposited is dissolved in hot alcohol, from which it crystallizes on cooling. It may also be procured by boiling stearic acid with an equal weight of nitric acid of sp. gr. 1.273; the solidified portion formed on cooling, becomes, by pressure and several crystallizations from alcohol, pure margaric acid. Margaric acid is in white, glossy, tasteless and odorless scales, melts at 140° F., and on cooling congeals in white, pearly prisms, running through each other; it is insoluble in water, soluble in ether and hot alcohol, and combines instantly with alkaline bases, decomposing the carbonates and forming soaps. Its formula is $C_{68} H_{66} O_6$ 2HO.

Olein is a combination of oleic acid and oxide of glycyl. To procure oleic acid treat oil of bitter almonds with potassa, and to the soap formed add hydrochloric acid; this separates the oleic and margaric acids. To the decomposed mixture add about half its weight of oxide of lead, and digest for two or three hours at a temperature of 212° F., by which means margarate and acid oleate of lead are formed. Ether is added which dissolves only the oleate of lead; the ethereal solution is mixed with an equal volume of water, to which hydrochloric acid is added as long as is required for decomposition, and the mixture must be well shaken. The ether rises to the surface holding the oleic acid in solution; decant it and distill it off, there remains a compound of pure oleic acid with oxidized acid. By subjecting this compound to a temperature of about 19° F. the pure crystals of stearic acid form, while the oxidized acid remains in the solution. Oleic acid is a tasteless, inodorous, colorless oily fluid at temperatures above 57°, but when once melted it does not solidify until cooled to 40°, and when solid it does not melt until heated to 57°. It is not soluble in water, but readily soluble in alcohol or ether, swims on water, and becomes brown by absorption of atmospheric oxygen. It forms salts or soaps with bases. Its formula is $C_{72} H_{66} O_6 2 HO$. The oleic acids of fat oils and of drying oils are very different; that of linseed oil is $C_{92} H_{76} O_{10} 2HO$.

When an alkaline base is added to fats or oils, a combination takes place between it and one or more of these fatty acids, forming soaps, or oleates, margarates, or stearates of the particular base which has been added, while at the same time, a principle is isolated, termed *Glycerin*, which see under its proper head. Among those soaps which are soluble in water the soda soaps are the hardest, the ammonia soaps the softest, while the potassa soaps rank between the two. Also with the fatty acids, stearic acid forms the hardest soaps, while oleic acid forms the softest. White Soap is a stearate of soda with some oleate. Naples soap is oleate and margarate of potassa. Castile Soap is oleate and margarate of soda, colored by metallic oxides, chiefly oxides of iron, in such a way as to give the desired mottled appearance. Common Soft Soap is chiefly oleate of potassa. There are many other fatty acids which form soaps with alkalies, as *Cocinine*, from the cocoa-nut, containing cocinic acid, and forming the Cocoanut-oil Soap, used for washing with sea-water; *Palmitine*, from palm-oil, containing palmitic acid, forming the Palm-oil Soap; *Phocenine*, from train or fish oil, containing phocenic acid, and forming Soft Soap, etc.

The theory of soap-making is very simple, depending on the affinity between the alkalies and the fat acids; on the solubility in water of the alkaline stearates, margarates, oleates, etc.; and, finally, on the power of a certain amount of free alkali or sea-salt, to coagulate the soap, and render it insoluble in the liquid in which it swims, and which in fact runs off its surface as water does off the surface of fat, while yet the soap retains perfectly its solubility in pure water.

Preparation.—"In order to form soap, the oil or fat is boiled with a solution of caustic potassa or soda, till the whole forms a thick, viscid emulsion, which can be drawn out into long, clear threads. If not clear, either water or alkali must be added, according as the turbidity depends on undecomposed oil, or on a deficiency of water. When the saponification is complete, the next step is to separate the soap from the excess of alkali, the glycerin, and the superfluous water. This may be effected by boiling down till the alkaline ley becomes very concentrated, when the soap becomes insoluble, and rises to the surface. The same end is attained by adding very strong ley or common salt, both of which render the soap insoluble when added in sufficient quantity; soap being absolutely insoluble in alkaline ley of a certain strength, as well as in a saturated solution of common salt. The separation is known to be complete when the liquid ceases to froth in boiling; and the soap is ladled off into molds, where it is well stirred to favor the separation of the liquid, which should run off from its surface like water from fat. The soap brought to this state in the first operation is called *grain soap*, from its separating in grainy particles at first. It may be further purified by repeating the process of dissolving in alkaline ley, and separating it by the addition of salt. In this process the impurities subside, and the soap generally takes up more water; so that, although whiter, it is less strong." "What is called *marbled* (or *mottled*) *soap* is grain soap which has not been subjected to purification; and the gray, blue, and green colors in it arise principally from the presence of insoluble soaps of oxide of iron or of copper. (The solution of the iron salt (protosulphate) being added, decomposition of it takes place, and protoxide of iron is diffused through the soap, giving its familiar marbled appearance. When the soap is cut up into bars and exposed to the air, the black protoxide passes by absorption of oxygen into peroxide; hence, a section of a bar of Castile Soap shows the outer edge red marbled, while the interior is black marbled). It is to be observed, that when common salt is added to the solution of a soap of potassa, the latter is converted into soda soap, entirely or partially, according to the quantity of salt, while chloride of potassium is formed. As this latter salt does not cause the soap to separate, like common salt, it is necessary to use twice as much salt to separate the soap when it has been made with potassa. If a soap of potassa be required, it must be separated by caustic potassa. In Germany, soda soap is first made with potassa, and the potassa soap is decomposed by common salt. In England and France, soda soap is made directly with caustic soda. The use of salt in this important process depends on the curious fact that soap, like muscular fiber or animal membrane, can not be moistened by a saturated solution of salt; that is, can not deprive it of water. On the other hand, if these substances be moistened with water, or dissolved in it, the addition of dry salt in sufficient quantity will remove the whole of the water."—*Turner's Chemistry*, *8th edition*, p. 1118.

History.—Alkaline soaps have a peculiar odor, according to the character of fat and alkali employed in their manufacture, a somewhat alkaline taste, and are soluble in water or alcohol, their solubility increasing with the elevation of temperature. The substance called *transparent soap* is prepared by evaporating an alcoholic solution of pure soap. There are several varieties of soap, three of which are used in medicine, viz.: 1. *Castile Soap*, Sapo Durus, which is prepared with olive oil and a solution of caustic soda; there are two kinds, the white and marbled. *White Castile Soap* is a purer but weaker soap than the marbled; "it is of an ashy-white color, quite dry, leaves no oleaginous spot on paper, is inodorous, not corrosive nor alkaline to the taste, is pulverizable, and completely dissolved by water or alcohol; when it continues damp, or has a saline efflorescence externally, it is not pure."—*Geiger*. *Marbled Castile Soap* is not so pure as the preceding, but is harder and stronger with alkali. The marbled appearance is produced by adding to the soap, as soon as it is completely made and separated from the spent ley, a fresh quantity of ley, and immediately after a solution of sulphate of iron. A precipitate is formed, which gives the dark-colored streaks to the soap.—*P.*

2. *Common Soap*, Sapo Vulgaris. This is made with tallow and soda, and there are two kinds of it, viz.: *White-curd Soap*, made with pure or white tallow and soda; and *Mottled Soap*, a domestic soap, made from refuse kitchen grease, etc. 3. *Soft Soap*, Sapo Mollis, a potash soap prepared from oil or fat.

The non-officinal soaps are as follows: *Windsor Soap*, Sapo Windsor, is made of olive oil two parts, tallow eighteen parts, soda to saponify, and perfumed with some essential oil. The following are the proportions for two kinds of Windsor Soap: *White-Windsor Soap*—take of white Curd Soap one hundred weight, Cocoanut-oil Soap twenty-one pounds, oil soap (olive oil and soda) fourteen pounds, oils of caraway, thyme, rosemary, of each, half a pound, oils of cassia, cloves, of each, four ounces. *Brown Windsor Soap.* Take of Curd Soap three-quarters of a hundred weight, Cocoanut-oil Soap, common yellow Rosin Soap, and Oil Soap, of each, one-fourth of a hundred weight, caramel half a pint, oils of caraway, cloves, thyme, cassia, petit grain, and French lavender, of each, half a pound. *Sapo Amygdalinus*, or Almond Soap, should be made as follows: Add to oil of almonds twenty-one ounces, in small proportions and stirring frequently, a solution of caustic soda (at 1.334 sp. gr.) ten ounces; leave the mixture for some days at a temperature of 64° to 68° F., stirring occasionally; then put into molds, until sufficiently solid, after which expose it to the air for eight weeks. The perfumers prepare it thus: Take of finest Curd Soap 100 weight, Oil Soap, Cocoa-nut oil Soap, each, 14 pounds, oil of almonds a pound and a half, oil of caraway half a pound, oil of cloves one-fourth of a pound. *Sapo Animalis*, or Beef's-marrow Soap, made by boiling beef-marrow with two parts of water, and half a part of soda ley; when saponified, add one-fifth of common salt, stir, remove the soap from the surface, and place it in molds. *Fuller's-earth Soap* is made of Curd Soap ten and a half pounds, Cocoanut-oil Soap three and a half pounds, baked fuller's earth fourteen pounds, oil of French lavender two ounces, oil of origanum one ounce. *Honey Soap* is composed of best Yellow Soap one hundred weight, Fig Soft Soap (commonest olive oil with potassa) fourteen pounds, otto of citronella one pound and a half. *Sand Soap* is prepared of Curd Soap and Cocoanut-oil Soap, each, seven pounds, sifted sea-sand twenty-eight pounds, oils of thyme, cassia, caraway, and French lavender, each, two ounces. *Camphor Soap* is made of Curd Soap twenty-eight pounds, oil of rosemary, camphor, each, one pound and a quarter. *Sapo Terebinthina*, or Starkey's Soap, made by triturating together one part, each, of oil of turpentine and dry carbonate of potassa, and afterward adding one part of Venice turpentine, continuing the trituration until the mass has a proper consistence; used in gonorrhea. *Yellow* or *Rosin Soap* is prepared with lard or tallow, rosin, and solution of caustic soda; frequently palm oil is added. *Saponaceous cream of almonds:* Melt seven pounds of fine clarified lead in a porcelain vessel, by a salt-water bath, or by a steam-heat under fifteen pounds pressure; then run in *very slowly*, potassa ley, containing 26 per cent. of caustic potassa, three pounds twelve ounces, agitating continually from right to left during the whole time; when about half the ley is run in, the mixture begins to curdle; it will, however, finally become so firm and compact that it can not be stirred, if the operation is successful. The soap is now finished, but it is not pearly; it will, however, assume that appearance by long trituration in a mortar, gradually adding alcohol three ounces, in which is dissolved, essential oil of almonds two drachms. This makes an excellent shaving soap. Glycerin has been introduced into toilet soaps, which retain their original soft consistence, and impart the unctuosity of the glycerin to the skin. For a description of fancy soaps, etc., see *Am. Jour. Pharm. XXVII.*, p. 558 to 565.

The adulterations of Castile Soap are numerous; they may be known by the following characteristics: white Castile soap is free from any unpleasant odor, is wholly dissolved by both alcohol or water, leaves no greasy spot upon paper, and does not suffer much loss in weight on drying. Soap is *incompatible* with sulphate of magnesia, sulphate of lime, chloride of lime, lime-water, metallic salts, alum, and all acids.

Properties and Uses.—Soap is internally slightly laxative; and externally it is detersive. Its action is very much like that of the alkalies, but less energetic; hence it may be administered in considerable doses without producing inflammation, though it readily disturbs digestion. As an antacid, it is useful in strong solution, in cases of poisoning by mineral acids, and also in acid conditions of the stomach. It has likewise been found serviceable in those cases of gravel in which uric acid prevails; but it does not dissolve the uric acid formations. In cases of poisoning by acids, it may be used until more effective agents can be procured, as chalk, lime, magnesia, or the alkaline bicarbonates. It is seldom used alone as a purgative, but is usually combined with aloes, gamboge, podophyllin, or other resinous cathartics, whose irritating properties are thereby modified. United with rhubarb, it forms a pill of much service in obstinate costiveness and biliary derangements; it lessens the astringent action of rhubarb. Externally it has been found serviceable in tinea-capitis, itch, and other cutaneous diseases, and as a discutient in glandular enlargements, abscesses, contusions, etc., in which it is used either in the form of liniment or plaster. An excellent injection is formed by making a strong soap-water from Soft Soap, and which will be found useful in obstinate costiveness, or where it is desirable to produce a prompt discharge from the bowels. In the preparation of pills, liniments, or plasters, we must be particular not to add agents which are chemically changed by the soap. Soap may be administered in a dose of from five to thirty grains, and is commonly used in the pilular form; in poisoning by mineral acids, half a pint of a strong solution should be promptly administered.

Off. Prep. of Common Hard Soap.—Linimentum Cajuputi Compositum; Linimentum Opii; Linimentum Saponis Camphoratum.

Off. Prep. of Castile Soap.—Pilulæ Aloes Compositæ; Pilulæ Podophyllini Compositæ; Pilulæ Saponi Compositæ.

Off. Prep. of Soft Soap.—Unguentum Sulphuris Compositum.

SAPONARIA OFFICINALIS.

Soapwort.

Nat. Ord.—Caryophyllaceæ. *Sex. Syst.*—Decandria Digynia.

THE ROOT AND LEAVES.

Description.—This is a stout, perennial herbaceous plant, sometimes known by the name of *Bouncing Bet*, with a *stem* from one to two feet in height. The *leaves* are lanceolate, inclining to elliptical, very acute, smooth, two or three inches long, and about one-third as wide. The *flowers* are many, large, flesh-colored or pale pink, often double and disposed in paniculate fascicles. The *calyx* is cylindrical, and slightly downy. *Petals* five, unguiculate; *crowns of the petals* linear. *Stamens* ten; *styles* two; *capsule* oblong, one-celled.—*G.*—*W.*

History.—Soapwort is found growing in Europe and the United States, by road-sides and in waste places, flowering in July and August. The parts used medicinally are the root and leaves; they are without odor, and of a bitterish, slightly saccharine taste, with a subsequent persistent pungency and a benumbing sensation. With water they become frothy, like soap-suds; water or alcohol extracts their active properties. Analysis has detected in the root a principle called *Saponin*, extractive, resin, gum, woody fiber, etc. Saponin appears to be its active principle, and is allied to esculin from the horse-chesnut, and senegin from seneka. According to Bussy, it may be obtained by boiling the powdered root of Soapwort in alcohol of 85 per cent., filtering the hot tincture, and allowing it to cool. The saponin partly precipitates, which is collected on a cloth, pressed between folds of blotting-paper, and dried. The process to be repeated until the root is exhausted. Saponin is white, friable, amorphous, has a sharp, persistent, acrid taste, and when snuffed excites powerful sneezing. It is soluble in water, frothing strongly when agitated, even when the solution contains only one-thousandth its weight of saponin. It is soluble in alcohol of all strengths, in one-fifth its weight of absolute alcohol, but insoluble in ether. It burns in the air, emitting a fragrant odor; when distilled it blackens, swells, and gives off an empyreumatic oil. Weak alkalies have no action on it while cold, nor dilute acids. Muriatic and acetic acids increase its solubility in alcohol. Boiling acids convert it into esculic acid; boiling potassa changes it into esculate of potassa. Its formula is $C_{36} H_{28} O_{24}$.—*P. A. Bolley.*

Properties and Uses.—Soapwort is tonic, diaphoretic, and alterative; and forms a valuable remedy in the treatment of syphilitic, scrofulous and cutaneous diseases, also in jaundice, liver-affections, rheumatism and gonorrhea. It is generally used in decoction; although an extract or the inspissated juice will be found equally efficacious. Dose of the decoction, from two to four fluidounces, three or four times a day; of the extract or inspissated juice, from ten to twenty grains. Saponin may be used as a substitute for the root, and will likewise be found a powerful sternutatory. Dose, from two to six grains.

SARRACENIA PURPUREA.

Sarracenia.

Nat. Ord.—Sarraceniaceæ. *Sex. Syst.*—Polyandria Monogynia.

THE ROOT.

Description.—This plant, also known as *Side-saddle Flower*, *Fly-trap*, and *Huntsman's Cup*, is an indigenous, perennial plant, of a very curious character. The *leaves* or *ascidia* are from six to nine inches long, radical, short-globose, inflated or cup-form, contracted at the mouth, having a broad arched lateral wing from half an inch to an inch in width, and extended on the outside of the mouth into a broad-cordate, erect lamina, or hood, covered above with reversed hairs. The *scape* is from one to two feet in height, terete, smooth, and supporting a single, large, purple, nodding *flower.*—*W.*

History.—This plant owes its strange appearance to a curious pitcher-shaped metamorphosis of the leaf, which resembles very much an old-fashioned side-saddle; six of these generally belong to each plant. The leaf, which springs from the root, is formed by a large, hollow tube swelling out in the middle, curved and diminishing downward till it ends in a stem, contracted at the mouth, and furnished with a large spreading, heart-shaped appendage at the top, which is hairy within, the hairs pointing downward, so as to cause every thing which falls upon the leaf, to be carried toward the petiole; a broad wavy wing extends the whole length on the inside; these lie upon the ground with their mouths turned upward, so as to catch the water when it falls. They hold nearly a wineglassful, and are generally filled with water and aquatic insects, which undergo decomposition or a sort of *digestion*, and serve as a nutriment to the plant. The stem rises direct from the root, it is round, quite smooth, and bears an elegant, deeply reddish-purple terminal flower, having two flower-cups; the external consisting of three small leaves; the internal of five, egg-shaped, obtuse leaves, shiny, and of a brownish-purple. The blossoms are five, guitar-shaped, obtuse, repeatedly curved inward and outward, and finally inflected over the stigma, which is broad and spreading, divided at its margin into five bifid lobes, alternating with the petals, and supported on a short cylindrical style; this is surmounted by the stamens, which are numerous, having short threads, and large two-celled, oblong, yellow anthers attached to them on the under surface. In the yellow-flowered species of the Southern States, the bottle is very long, resembling a trumpet, by which name it is often called.

The whole species are water-plants, and are found only in wet meadows, wet, boggy places, marshes, mud-lakes, etc., and grow from Labrador to Florida, flowering in June. There are several varieties, as the *S. Heterophylla*, found in the swamps at Northampton, Mass., and the *S. Rubra*, *S. Flava*, *S. Variolaris*, *S. Drummondii*, and *S. Psyttacina*, which are common to the South, and all of which, probably, possess similar medical virtues. The root is the part used; it has a bitter and astringent taste, and yields its properties to water. It contains coloring matter, resin, an acid salt of lime, an unknown salt, and lignin.

Properties and Uses.—The therapeutical actions of Sarracenia are not fully ascertained. It is supposed to be a stimulating tonic, diuretic, and laxative; in connection with osmunda regalis and blue cohosh, it will form a valuable syrup for chlorosis, all uterine derangements, dyspepsia, and other gastric difficulties. An infusion of the leaf has been found equally available with that of the root. The best mode of employing it is not well determined; though the powder may be given in doses of from twenty to thirty grains three or four times a day; and the infusion from one to three fluidounces. In relation to this plant, Prof. C. H. Cleaveland makes the following remarks:

"During the year 1847, Dr. F. P. Porcher, of South Carolina, experimented with the *root*, or that portion of the stem which is below the surface of the ground; and he details the following results: He thinks the *bitter* and *astringent* principles of the plant are imperfectly extracted by water, and that the *decoction* is even more destitute of these properties than the cold infusion. He made trial of the root, in a recent state, as well as of the dried root, on his own person, and he gives the following as the result of one of his experiments: 'Dec. 4th.—We again commenced experimenting with it. It had become dry, having been rolled into pills of three grains each. Of these we took sixty (180 grs.) between ten and twelve o'clock, P. M., upon a comparatively empty stomach, swallowing them, at intervals, six or eight at a time. Its diuretic action in this instance was frequently repeated—the secretion being increased in quantity, pure, limpid, and colorless, with scarcely any sediment after several hours' standing.

"'Its action on the stomach, resembled that following its first employment, being attended with the same phenomena. A feeling of emptiness was produced in the course of an hour. After retiring to bed, the whole abdominal region was in a state of commotion—extending along the tract of the ascending and descending colon, all of which appeared to participate in a kind of rolling motion produced by it. To these, were added involuntary rumbling sounds, as if the entire alimentary tube was stimulated, and apparently forewarning a cathartic effect. We are led to believe, that its astringent property presented this result. There was, also, tenderness on pressure at the epigastrium.

"'The feeling of congestion about the head, with irregularity of the heart's action, which *lasted several days*, was again observed. Before morning, the pulse rose to one hundred by the watch; resuming its usual frequency after a time. We were prevented by sleep, which was much disturbed, from ascertaining positively the co-existence of strange impressions on the sensorial functions. The general vigor of the digestive apparatus was increased. The appetite following the next day was unusually active; seeming to demand much more to satisfy its requirements; but there was a sense of pain about the stomach, like that following inflammation, or that felt in the muscular tissue after a limb has been overtasked.'

"In the first experiment, in which Dr. Porcher took one hundred and forty grains of the *fresh* root, the symptoms produced were very similar to those detailed in the above quotation; pointing distinctly to the parts of the system influenced by the drug; namely, the gastric filaments of the ganglionic, or organic system of nerves. This produced an increased action of the circulatory system, and drove the blood to the head. It also increased the peristaltic motion of the entire alimentary canal, and promoted the renal, and other glandular secretions, without any apparent effect upon the nerves of animal life.

"As the experiments of Dr. Porcher are directly corroborative of those made by the writer, and confirmatory of the utility of the plant in all cases where there is a sluggish or torpid condition of the stomach, the intestines, the liver, the kidneys, or the uterus, producing costiveness, dyspepsia, amenorrhea, dysmenorrhea, and the various functional derangements which are so commonly to be met with, it must be evident, that this plant possesses valuable properties, which render it well worthy the attention of the enlightened practitioner.

"The plant has not yet been much used. It would, therefore, appear improper to speak of the best mode of preparing it, or of the amount necessary to be given to produce the desired result. Probably, however, it will seldom be found necessary to resort to the heroic doses taken by Dr. Porcher, or to expect from its use the *immediate* effects observed by him. In almost all cases, gastric debility, dyspepsia, sick-headache, etc., are accompanied with a constipated condition of the bowels; and it would seem desirable to prepare the article in such a way as *not* to extract the astringent principle, whatever that may be; and doubtless the infusion or the syrup is as good a preparation as any. In those cases, however, which sometimes occur, when there is chronic diarrhea, without much inflammation of the intestines, it is altogether probable, that a cold infusion would be preferable.

"It is even possible, that a new salt, similar to morphia or quinia, might be extracted from the plant, and a new and valuable remedy be added to our Materia Medica."

SATUREJA HORTENSIS.

Summer Savory.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE LEAVES.

Description.—Summer Savory is an annual plant, with a branching and bushy *stem*, about eighteen inches in height, woody at base, frequently changing to purple. The *leaves* are numerous, small, linear-oblong, entire, acute at the end. The *flowers* are pink-colored, on axillary, cymose peduncles. The *calyx* is tubular, ribbed, and about as long as the corolla. The *corolla* is bilabiate, with nearly equal divisions; *stamens* diverging, scarcely exserted.—*W.*

History.—This well known plant is a native of the south of Europe, and is extensively cultivated in the gardens of this country and Europe for culinary purposes, flowering in July and August. The leaves are the parts employed. They have an aromatic odor and taste, analogous to those of thyme, and impart their properties to boiling water in infusion, but more freely to alcohol. Its virtues depend upon a volatile oil.

Properties and Uses.—Summer Savory is a stimulant, carminative, and emmenagogue. A warm infusion is beneficial in colds, menstrual suppression, and flatulent colic; the cold infusion is a gentle stimulating tonic during convalescence from fevers. The infusion may be used in doses of from two to four ounces several times a day. The oil is sometimes used as a local application to carious teeth for relieving toothache; and its tincture is a valuable carminative. The *S. Montana*, or Winter Savory, with mucronate *leaves*, somewhat one-sided peduncles, and acuminate and mucronate *segments of the calyx*, possesses similar properties.

SCILLA MARITIMA.

Squill.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE BULB.

Description.—Squill is a perennial plant with a roundish-ovate *bulb*, very large, half above ground, with the integuments either pale-green or red, and giving off fibrous *roots*. The *leaves* proceeding from the bulb, are broad-lanceolate, channeled, spreading, recurved, shining, deep-green, and make their appearance long after the flowers. The *scape* is two or three feet high, and terminated by a rather dense, long, ovate raceme. The *flowers* are about three-fourths of an inch in diameter, spreading, pale, yellowish-green, with a green stain on the middle of each segment. *Peduncles* purplish;

bracts linear, twisted, deciduous. *Filaments* shorter than the segments of the perianth.—*L.*—*Wi.*

History.—Squill is a native of almost every part of the Mediterranean coast, and is also met with in Portugal and France. It flowers in August and September. Steinheil has proposed to remove it into a new genus under the name of *Squilla Maritima*, as the structure of its nectaries and seeds distinguish it from the genus Scilla. The only part used is the bulb. When recent it is pyriform, from three to six inches in its largest diameter, and consists of concentric scales, the outer ones of which are thin and membranous, while the inner ones are whitish, thick, fleshy, and full of juice; they weigh on an average from one to four pounds, though they have attained a weight of ten pounds and a half. Two kinds of Squill, both abounding in an acrid juice, and having a bitter taste, are met with in commerce, the *white* and the *red*, so called from the color of their scales. The white is preferred. The juice of the fresh bulb is very acrid and vesicating, but is rendered much milder by desiccation. When intended for medical use, Squill bulbs ought not to be kept entire, but should be stripped of their outer scales, cut transversely into thin slices, and dried carefully at a temperature about 100° F. When recent, these slices have a mucilaginous, disagreeably bitter, and somewhat acrid taste, with a feeble radish-like odor. As ordinarily met with, dried Squill is in scales or slices of various sizes, wrinkled, somewhat translucent, white or yellowish-white, friable and easily reduced to powder, nearly inodorous, and of a mucilaginous, strongly bitter, sickening, slightly acrid taste. They attract moisture from the air, and then become pliable and spoiled, on which account they, as well as their powder, should always be kept in well closed vessels. Squill yields its properties to water, spirit, or diluted acids; but the best solvents are proof-spirit or vinegar.

Vogel found in the dried root, Scillitin, with some sugar 35, tannic acid 24, gum 6, woody fiber, and some citrate of lime 30, acrid volatile matter. Tilloy found in it Scillitin, uncrystallizable sugar, gum, fatty matter, and piquant very fugaceous matter. *Scillitin* may be obtained from the fresh bulb according to the following process of M. Landerer: digest the pounded bulb in dilute sulphuric acid, and boil the solution down to one half, saturate this with lime to neutralize, and let it stand for three days. Dry the precipitate, and then digest it in alcohol of sp. gr. 0.838; let this evaporate spontaneously, when prismatic crystals will be deposited. They are bitter, alkaline, soluble in 120 times their weight of alcohol, insoluble in water, and fixed and volatile oils, and neutralized acids. Tilloy obtained it from dry Squills, by macerating them in alcohol, decanting, and evaporating to the consistence of a syrup. Mix this syrup with alcohol of sp. gr. 0.842. There remains an extractive matter which must be well kneaded with alcohol. Evaporate the alcoholic solution to the consistence of an extract. Digest the extract in ether, which dissolves a yellow-colored solid fatty matter, having an acrid and bitter taste, insoluble in water, but very soluble in alcohol, ether, and the alkalies. The residue insoluble in ether, is treated with water, which separates Scillitin in yellow flocks. These flocks are collected on a filter. Scillitin thus obtained is softened in hot water, and collected in a mass; is brown when cold, brittle, acrid, and bitter; melts by heat, swelling up, giving at first an aromatic, and then a urinous odor. It is insoluble in ether, soluble in alcohol; and one grain of it killed a dog. Tilloy analyzed this plant again a few years since, with somewhat different results. Chemists are so divided upon the characters of Scillitin, that further investigations are required.—*T.*—*C.*—*P.* Squill kills rats almost instantly; two drachms of powdered Squill may be made into balls with half a pound of strong smelling cheese, and thrown where they visit.

Properties and Uses.—Squill is irritant, emetic, carthartic, diuretic, and expectorant. In large doses it is a dangerous irritant poison, producing inflammation of the alimentary canal, and urinary organs, and proving fatal in the dose of only twenty-four grains of the powder. Some constitutions are so susceptible of its irritant action, that it can not be safely used in any dose, unless combined with opium. It is seldom used as an emetic or cathartic, on account of its uncertainty in producing these effects. In small doses it causes nausea and depression of the pulse, and never stimulates the circulation. Its expectorant action is greatly increased by the addition of opium; and its diuretic by the conjunction of digitalis, or some other vegetable or saline diuretic. It is used in dropsy, catarrh, pneumonia, asthma, and phthisis. It acts better in general than in local dropsies, and also in those of an asthenic character. As an expectorant it will be found useful in chronic catarrh, humid asthma, winter cough, and other chronic bronchial affections. Troublesome vomiting or purging caused by Squill is best corrected by opium. Where there is much inflammation or vascular excitement, it is contra-indicated. Dose of the powder, as a diuretic and expectorant, from one to three grains; as an emetic, from six to twelve grains; of the syrup, one or two fluidrachms. The pilular form is the best when Squill is given in powder.

Off. Prep.—Acetum Scillæ; Syrupus Scillæ.

SCROPHULARIA NODOSA.

Figwort.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES AND ROOT.

Description.—Figwort has a perennial, whitish, tuberous, and knotty *root*, with a leafy, erect, quadrangular, smooth *stem*, from two to four feet in height, with paniculate, opposite *branches* above. The *leaves* are opposite, petiolate, ovate, ovate-oblong, or the upper lanceolate, acute, sharply and unequally serrated, rounded, acutish, or broadly cordate at base, veined, of a deep green color, and from three to seven inches in length.

The *flowers* are small, three or four lines long, ovoid, dark-purple, slightly drooping, and borne on axillary and terminal, forked, angular, glandular peduncles in oblong thyrsoid panicles. *Calyx* in five segments which are broadly ovate, obtuse, slightly margined; *corolla* of a dull green, with a livid purple lip, subglobose; *limb* contracted, sublabiate, having a green scale or sterile filament, adnate to the upper side. *Stamens* didynamous; *sterile anthers*, broadly orbicular. *Capsule* ovate-oblong.—*L.*—*W.*—*G.*

History.—This plant is a native of Europe, and found growing in different parts of the United States, in woods, hedges, damp copses, and banks, flowering from July to October. The *S. Marilandica* and *S. Lanceolata*, known by the names of *Carpenter's Square*, *Healall*, *Square-stalk*, etc., are mere varieties, possessing similar medicinal properties. The leaves and root are the officinal parts, and yield their virtues to water or alcohol. The leaves have an offensive odor, and a bitter, unpleasant taste; the root is slightly acrid. Much of the odor and taste are lost by drying. The reddish aqueous infusion is darkened by the sesquichloride of iron, but not by tincture of nut-galls. Grandoni found it to contain brown bitter resin 0.31, extractive with gum 4.84, extractive having the odor of benzoic acid 0.88, chlorophyll 1.58, starch 0.23, greenish fecula 0.18, besides gum, starch, inulin, malic and pectic acids, etc.

Properties and Uses.—Figwort is alterative, diuretic, and anodyne; highly beneficial in hepatic diseases, scrofula, cutaneous diseases, dropsy, and as a general deobstruent to the glandular system when used in infusion or syrup. Externally, in the form of fomentation, or ointment, it is valuable in bruises, inflammation of the mammæ, ringworm, piles, painful swelling, itch, and cutaneous eruptions of a vesicular character. The root, in decoction, and drank freely, is said to restore the lochial discharge when suppressed, and to relieve the pains attending difficult menstruation. This plant possesses valuable and active medicinal properties. Dose of the infusion or syrup, from two to four fluidounces.

Off. Prep.—Decoctum Scrophulariæ; Syrupus Rumecis Compositus.

SCUTELLARIA LATERIFLORA.

Scullcap.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE WHOLE HERB.

Description.—Scutellaria Lateriflora has a small, fibrous, yellow, perennial *root*, with an erect, very branching, diffuse, quadrangular, nearly glabrous *stem*, from one to three feet in height; the *branches* are opposite. The *leaves* are on petioles about an inch long, opposite, thin, entire, nearly membranous, subcordate on the stem, ovate on the branches, acuminate, or acute, coarsely serrate and slightly rugose. The *flowers* are small, of a pale blue color, and are disposed in long, lateral, axillary racemes, with ovate, acute, entire, subsessile, distichous bracts, each flower axillary to a bract, and pedunculated. The *calyx* has an entire margin, which, after the corolla has fallen, is closed with a helmet-shaped lid. The *tube of the corolla* about a quarter of an inch long, the upper lip concave and entire, the lower three-lobed. *Seed* four in the closed calyx, oval, verrucose.—*W.—G.—B.*

History.—Scullcap is an indigenous herb, growing in damp places, meadows, ditches, and by the sides of ponds, flowering in July and August. It is known by the names of *Blue Scullcap*, *Side-Flowering Scullcap*, *Mad-dog Weed*, and *Hood-wort.* The whole plant is officinal; it should be gathered while in flower, dried in the shade, and kept in well-closed tin vessels. It is inodorous, but has a bitterish taste; alcohol or boiling water extracts its properties. Scullcap is said to contain an essential oil; a fixed oil, yellowish-green, and soluble in ether; a bitter principle soluble in water, alcohol, or ether; chlorophyll; a peculiar volatile matter; albumen; a sweet mucous substance; a peculiar astringent principle; lignin, chloride of soda and other salts.

Properties and Uses—Scullcap is tonic, nervine, and antispasmodic. This is one of those valuable agents which a certain class of physicians consider inert; yet it has proved especially useful in chorea, convulsions, tremors, intermittent fever, neuralgia and all nervous affections. In delirium tremens, an infusion drank freely will soon produce a calm sleep. In intermittents it may be beneficially combined with bugle. Where teething has impaired the health of children, an infusion may be given with advantage. In all cases of nervous excitability, restlessness, or wakefulness, attending acute or chronic diseases, or from other causes, it may be drank freely with every expectation of beneficial results. The warm infusion has a tendency to keep the skin moist; the cold has a tonic influence, and either may be drank freely. When its soothing effects have ceased, it does not leave an excitable, irritable condition of the system, as is the case with some other nervines. Half an ounce of the dried leaves or herb, to a half a pint of boiling water, will make a very strong infusion. Scullcap has been extolled as a remedy in hydrophobia, but this is still a matter of uncertainty. The *S. Hyssopifolia* and *S. Integrifolia* possess similar properties.

A Chemical Institute of the city of New York, profess to have prepared a concentrated preparation of Scullcap, in the form of a whitish powder, which they name *Scutelline*, and recommend as a tonic, nervine, etc., highly useful in nervous diseases. Having never seen the article, and not having been able to learn its mode of preparation, which appears to be kept a secret, with many of their other preparations, I can only refer to it as a nostrum.

Off. Prep.—Extractum Scutellariæ Hydro-alcoholicum; Extractum Scutellariæ Fluidum; Infusum Scutellariæ; Pilulæ Valerianæ Compositæ.

SCUTELLARINE.

Scutellarine.

THE CONCENTRATED PREPARATION FROM SCULLCAP.

Preparation.—Make a tincture of the herb, Scutellaria Lateriflora, with Alcohol of 76 per cent., distill off the alcohol until the liquid is of the consistence of a fluid extract, add to it several times its weight of Water, and precipitate with a Solution of Alum. Wash the precipitate to free it from the alum, and dry it in the open air, without heat.—*Prof. C. H. Cleaveland.*

History.—As far as this has been chemically tested, it has manifested neither acid nor alkaline reaction, and as it is not a resin, it is for the present classed among the neutral principles with salicin. It forms a powder of a green color, owing to the chlorophyll not having been separated; but although not chemically pure, it is sufficiently so to be of great use in medicine. It is of a light greenish-brown color, with a faint, tea-like odor, and a peculiar, herbaceous, somewhat gritty, resinous, tea-like taste, is insoluble in water, partially soluble in alcohol, and more so in ether.

Properties and Uses.—This is one of our most valuable nervines and tonics, and is especially useful in cases of depression of the nervous and vital powers after long sickness, over-exercise, excessive study, or from long-continued and exhausting labors. One grain will frequently produce its quiet and soothing effect, controlling nervous agitation, and inducing a sensation of calmness and strength. It has been advantageously combined with cypripedin, cimicifugin, and caulophyllin in various female difficulties, both in the gravid or non-gravid state, accompanied with an excitable or irritable condition of the nervous system. It may be used wherever Scullcap is indicated. Its dose is from one to five grains, three or four times a day, though an increased quantity will not produce any unpleasant effects.

SECALE CEREALE.

Rye.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

THE SEED OR GRAIN.

ERGOTA. (*Secale Cornutum.*)

Ergot. Spurred, or Smut Rye.

DEGENERATED SEEDS OF SECALE CEREALE AND A FUNGUS.

Description.—Rye has a *stem* from four to six feet high, hairy beneath the spike, in a wild state seldom over a foot high. The *leaves* are lance-linear, rough-edged and rough above, glaucous; the lower ones, together with their sheaths, covered with a soft down. *Rachis* bearded on each side with white hairs. *Glumes* subulate, ciliated, scabrous shorter than the florets, taken together with their awns. *Outer paleæ* folded up, keeled, tri-nerved, with very long awns; the two nerves and awns very rough. *Stamens* three. *Ovary* pyriform, pilose. *Stigmas* two.—*L.*—*W.*

History.—The native country of Rye is not positively known, though supposed to have originated about Caucasus; at the present day it is considerably cultivated among civilized nations. Ground into fine flour it is used as an article of diet in the form of bread or mush. Rye-bread is not so light-colored, nor so readily digested as wheat-bread. According to Einhof, the grain consists of about six and a half per cent. of meal, the balance being husk or bran nearly two and a half per cent., and moisture. The meal consists of starch 61.07, gum 11.09, gluten 9.48, albumen 3.28, saccharine matter 3.28, husk, salts, acid, etc.—*P.*

Rye is frequently diseased and rendered poisonous by a parasitical fungus, the *Ergotœtia Abortifaciens* of Quekett, or *Oidium Abortifaciens* of Berkeley. This is a microscopic fungus, belonging, according to Berkeley, to the genus Oidium. Its *threads* are white, irregularly branched; *sporidia* numerous, elliptical, moniliform, finally separating, transparent, sometimes slightly contracted about their middle, usually containing one, two, or three, but occasionally as many as ten or twelve well defined greenish granules. They average about $\frac{1}{4000}$ of an inch long, and $\frac{1}{6000}$ of an inch broad. When placed on glass and moistened with water, they readily germinate or produce other plants, though in various ways.—*Quekett.* By the growth of this plant upon the ovarium of grasses, a disease is produced therein, involving the whole of the embryo, which is called *Spur* or *Ergot.* (Tulasne denies it is a disease.) It attacks Rye, wheat, corn, etc., and the ergotized grains of the first two appear to possess similar medicinal properties. Much discordance of opinion has heretofore obtained in relation to the nature and formation of Ergot, but the microscopic researches of Pereira, Quekett, and others, have settled the question as to its parasitical origin, but the real character of the parasite is still undetermined.

More recently this plant has been examined by Tulasne, who appears to have placed its history upon a scientific basis. He considers it as belonging to the genus Claviceps of the family Sphæriacei, an Ascomycetous Fungus, of which he describes three species, *Claviceps nigricans*, *C. microcephala*, and *C. purpurea*, the latter growing on the flowers of grasses, such as Rye, wheat, oats, and numerous pasture grasses. The first sign of the attack upon the flower of a grass is the appearance of the parasitical fungus (*sphacelia*) upon the outside of the nascent pistil, which extends over all parts of the grain, coalescing the stigmas and anthers, and giving a whitish appearance to the grain; it then enters into the outer part of the substance of the wall of the ovary, growing with this until it forms a fungoid mass of the same shape as an ovary, but obliterating the cavity of the latter. At this time it is soft, white, grooved on the surface, and excavated by irregular cavities, which are connected with the external folds or grooves; the surfaces of these are all covered with parallel linear cells, like a hymenium (the term applied to the layer of cellular tissue upon which are seated the basidio-spores of the higher Fungi), and from the extremities of these arise elongated, ellipsoid or oval cells, about $\frac{1}{5000}$ of an inch in length. These bodies become detached, and when they are placed in water, germinate and emit filaments; they are sperm-cells (*spermatia*), naked spores (*stylospores*), or perhaps reproductive cellules (*conidia*); they exhibit no motion in water, although they resemble the spermatia of some other fungi. At this time Tulasne calls the structure a *spermagonium* (an organ supposed to contain fertilizing bodies). At a certain epoch a viscid fluid exudes from the *sphacelia*, flowing over it and carrying about multitudes of the *spermatia* or *stylospores;* but previous to this, a solid body, of a violet color on the surface and white within has originated at the base of the *spermagonium*, and it gradually grows and rises out of the paleæ of the flowers, forming the spur or *Ergot.* This is not a metamorphosed seed resulting from diseased conditions, but a real new fungoid structure.

Ergot should be gathered previous to harvest, and is said by M. Bonjean to be much more active after the fifth day of its formation. "When we examine a number of ears of ergotized Rye, we find that the number of grains on each spike which have become ergotized varies considerably; there may be one only, or the spike may be covered with them. Usually the number is from three to ten. The mature Ergot projects considerably beyond the paleæ. It has a violet-black color, and presents scarcely any filaments and sporidia. The Spurred Rye, or Ergot of commerce, consists of grains which vary in length from a few lines to an inch, or even an inch and a half, and whose breadth is from half a line to four lines. Their form is cylindrical or obscurely triangular, with obtuse angles, tapering at the extremities (fusiform), curved like the spur of a cock, unequally furrowed on two sides, often irregularly cracked and fissured. The odor of a single grain is not detectable, but of a large quantity is fishy, peculiar, and nauseous. The taste is not very marked, but is disagreeable and very slightly acrid. The grains are externally purplish-brown or black, more or less covered by a bloom, moderately brittle, the fractured surface being tolerably smooth, and whitish or purplish-white. Their specific gravity is somewhat greater than that of water, though, when thrown into this liquid they usually float at first, owing to the adherent air. The lower part of the grain is sometimes heavier than the upper."—*P.* When Ergot is examined under the microscope, its *internal part* is seen to be composed of minute hexagonal or rounded cellular tissue, the cells containing from one to three globules of oil; its *violet* or *blackish coat* consists of a layer of longitudinally elongated delicate cells, and its *bloom* consists of sporidia. Unless kept carefully excluded from the air, it softens and swells, and becomes infected with numerous brown insects, about the size of a pin's head, while at the same time it acquires a deep black color and heavier odor. Its powder quickly becomes damp, and full of animalcules. It should always be used recently pulverized, or if kept in powder, it should be in well closed and darkened vials, and with a few lumps of camphor added. It imparts its virtues to water or alcohol; long boiling renders it inert. The best Ergot is dry, and easily broken, free from insects, burns with a clear flame, and is incapable of forming a dark-blue pulp when its powder is triturated with iodine and water.

Dr. R. J. Nunn, of Savannah, Ga., recommends the following method as an effectual mode of preserving Ergot: Reduce good Ergot to a coarse powder in a mortar or coffee-mill, and dry it at a temperature not exceeding 139° F. Next prepare a solution of camphor, eighty grains to a fluidounce of ether. Clean and dry some strong ounce vials, being careful that they contain no moisture. Place a fluidrachm of the camphor solution into a vial, and immediately begin filling with the dry Ergot, pressing the powder very tightly several times while filling, with a suitable instrument. As soon as soon as the bottle is filled, and the whole of the Ergot is observed to be dampened by the camphor solution, pour half a fluidrachm more of it into the vial, and immediately cork with some *good tightly fitting velvet corks*, and cover the top with sealing-wax. If larger bottles are used, increase the quantity of solution proportionately. Examine the vials occasionally; if the wax softens, or any part of the powder becomes dry, it is an indication that the cork does not fit tight; it must then be removed, a little more solution added, recorked, and resealed. Ergot has thus been kept for eight years. The heat of the water used to make the infusion of Ergot will be amply sufficient to vaporize and expel every particle of the ether and camphor.—*Am. Jour. Pharm.*, *XXVII.*, 309.

Ergot has undergone several analyses. Wiggers found in it, 1.25 ergotin; 35 peculiar fixed oil; 1.05 white crystallizable fat; 0.76 cerin; 46.19 fungin; 7.76 vegetable ozmazome; 1.55 peculiar saccharine matter; 2.33 gummy extractive, with red coloring matter; 1.46 albumen; 4.42 superphosphate of potassa; 0.29 phosphate of lime, with trace of iron; 0.14 silica. Legrip's analysis gave much less fungin, 3.50, a brown resin 2.75, etc. H. L. Winckler gives as the most important chemical constituents, secaline in combination with ergotine, a red ferruginous coloring matter with a base yet to be eliminated, albumen soluble in water and in a coagulated condition, a large quantity of fatty oil, which in the normal grain appears to be replaced by amylon, fungous sugar, which disposes the watery extract of Ergot of Rye so strongly to fermentation, formiates, and phosphates. He considers the specific action of Ergot ascribable to the secaline compound, or the coloring matter, or both of these compounds together and not to the fatty oil. A watery extract is, he states, the most active preparation, but it can not be kept; a tincture, prepared with alcohol of 40 per cent., by several days' digestion at an ordinary temperature, from finely pulverized Ergot, is of a dark brown color, and contains all the active constituents of the Ergot, with very little fatty oil, which separates in a crystalline form at very low temperatures. The spirituous extract is best kept and most effective when it is prepared by twice extracting the fine powder with an equal quantity of cold distilled water, clarifying the concentrated extract, and treating it with alcohol of 80 per cent. as long as a precipitate results on the addition of a fresh portion. The spirituous fluid is after twenty-four hours separated from the precipitate by filtration; the filtrate subjected to distillation in a water-bath, and the residue evaporated to the consistence of an extract. Obtained in this way, the extractive ergotine is a little hygroscopic, has a light-brown color, a slight narcotic odor, dissolves under the separation of a little ergotine (*Wiggers*) in water, and evolves, when treated with a solution of caustic potassa, the penetrating odor of secaline in a high degree. By distillation of the concentrated watery extract with caustic lime, a very concentrated solution of secaline is also obtained. Winckler has found the compound of ergotine with secaline, *ergotinate of secaline*, in the black sporous mass of *Lycoperdon Cervinum.—Am. Jour. Pharm., XXV.*, 412, *from Central Blatt, etc.*

Winckler dried some recent Ergot of Rye at 139° F., pulverized it, and extracted first with ether, then with water. The aqueous solution was treated with strong alcohol, and separated from albuminous matter by filtration: the spirit was distilled off and the residue brought to dryness. During this operation a small quantity of a brown powder (*the ergotine of Wiggers*) was precipitated, which again dissolved in the concentrated liquid. The residue above (*Winckler's extractive ergotine*) dissolved readily in alcohol and water, under the precipitation of a light-brown powder (*the ergotine of Wiggers*). It had a bitterish, cooling taste, and, when distilled with quicklime, afforded a distillate with the odor of herrings, containing propylamine or trimethylamine, but no ammonia. The residue consisted of a compound of secaline (*a volatile base*), with Wiggers' ergotine, which Winckler regards as an acid. The solution with ether, first extracted, contained a fatty oil, equal to 34 per cent. of the Ergot. By treating Ergot with alcohol acidified with sulphuric acid, he extracted a red ferruginous coloring matter.—*Jour. Pharm. and Trans. XIII., p.* 86.

The *Oil of Ergot* recommended by Dr. Wright contains the active principle of Ergot, and is very generally employed as a substitute for the crude article. It may be obtained by percolating finely-powdered Ergot with ether, and allow the ether to evaporate spontaneously. It consists of a colorless and translucent portion, and a reddish-brown one; but as the oil grows older, it becomes more colored throughout. Its taste is oily and slightly acrid, is of less specific gravity than water, is soluble in ethers, alcohol, naphtha, essential oils, creasote, caustic alkalies, bisulphuret of carbon, and is not acted upon by dilute mineral acids. Its effects are identical with those of Ergot. The expressed oil is destitute of the peculiar medicinal influences possessed by that prepared by means of ether.

Ergot is *incompatible* with acetate and diacetate of lead, nitrate of silver, and tincture of galls. Iodine does not indicate starch in it. Its aqueous infusion is red and possesses acid properties.—*P.*

M. Payen found *Rye* to contain starch 65.65 parts; gluten and other azotized matters, 13.50; dextrine, glucose, or other congenerous substances, 12.; fatty matters, 2.15; cellulose, 4.10; silica, phosphates of lime, magnesia, and soluble salts of potassa and soda, 2.60.

Properties and Uses.—Ergot exerts a remarkable effect on the human system, more especially when its use has been persevered in for some time. Its most serious influences are those occasioned by its continued use as an article of food, and which are manifested by certain symptoms termed *ergotism*, and which assumes two types—*convulsive ergotism* and *gangrenous.* The first form is characterized by weariness, giddiness, muscular contraction, formication, dimness of sight, voracious appetite, loss of sensibility, yellow countenance, convulsions and death. The second is likewise accompanied by formication, voracious appetite, insensibility, and gangrene of the extremities, with dropping off of the toes. In doses of from thirty to sixty grains, and especially when the stomach is in an irritable condition, it frequently causes vomiting and nausea. When given in large doses it is apt to affect the cerebro-spinal system, as known by heaviness of the head, headache, vertigo, enlarged pupils, and other symptoms of narcotism. It frequently lessens the action of the heart and arteries, though sometimes this is increased, with febrile symptoms, especially during parturition. A single dose, varying from two to eight drachms, has occasioned vomiting, colic, pains, and headache; single doses of one or two scruples have no great influence under ordinary circumstances.

Medicinally, Ergot is used on account of its power of promoting uterine contraction in languid natural labors. When thus employed, it produces a strong, continued, and, as it were, spasmodic contraction of the uterus, seldom permitting any relaxation until the child is born, and often continuing for some minutes after. The contractions and pains caused by Ergot are distinguished from those of natural labor by their continuance; scarcely any interval can be perceived between them, but a sensation is experienced of one continued, forcing effort. Sometimes Ergot causes no unpleasant effects on the system; and likewise fails to excite uterine contractions, which will be found the case with other parturient agents. The causes of these failures are not known, being merely conjectural. It is said that Ergot poisons the child, and causes its death. This may, probably, sometimes be the case, but I am induced to believe that the fatality more generally ensues in consequence of the long-continued and constant pressure of the contracted organ upon the cord and fetus, causing its utero-fetal circulation to cease, and thus destroying it by asphyxia. In a state of pregnancy, Ergot will occasion abortion, though it sometimes fails here likewise. It also influences the non-gravid uterus, producing painful contractions or bearing-down pains, and on this account has been useful in checking menorrhagia, uterine hemorrhage, and in expelling polypous masses.

As a parturient, its use should always be avoided, if possible, in first labors. The conditions for safety and success are, that the labor be somewhat advanced, the mouth of the womb be moderately dilated, that no mechanical obstruction to delivery exists, as deformity of the pelvis, rigidity of the os uteri, mal-presentation, or, disparity of the size of the child to the parts of the mother, and, more especially, that the only cause of the slow progress of labor is insufficiency of the uterine contractions in point of force or frequency. One or two drachms of the powder may be stirred in four fluidounces of hot water, and when sufficiently cool may be given in tablespoonful doses every ten minutes until labor-pains are induced; usually, in fifteen or twenty minutes the labor-pains increase in force and frequency, and gradually become continuous, and effect the expulsion of the child within an hour. Many objections are raised to its use, but, in general, if prudently administered, no bad effects will ensue. In those cases where the child is dead, and circumstances require prompt delivery, as, where the patient is greatly exhausted, or where the system becomes very irritable, etc., Ergot may be administered. It may likewise be administered to facilitate abortion when it has once commenced, as well as to check uterine hemorrhage in the gravid or non-gravid state. It may likewise be given with advantage in retained placenta, as well as promoting the expulsion of a mole, hydatids, a clot of blood, or other uterine contents, when the womb has once begun to act. It is doubted by many whether it will excite uterine contractions in any instance, unless a natural movement toward such action has commenced; but, as previously remarked, there is no doubt of its influence upon the womb at other times than that of parturition. In small doses it has been recommended in painful dysmenorrhea, where membranous shreds pass off. It has been efficaciously employed in leucorrhea, gonorrhea, amenorrhea, and paraplegia. Sometimes it has proved advantageous in paralysis of the bladder, fever and ague, etc., but is rarely employed for these purposes. In these affections it may be given in doses of from five to ten or fifteen grains three times a day; but its use should not be persisted in too long, on account of its tendency to cause dangerous symptoms.

The *Oil of Ergot* may likewise be used as an aid to parturition, and in uterine affections, in the place of Ergot; it is equally effectual in doses varying from twenty to fifty drops, and which may be given in water, tea, or some aromatized syrup. In the dose of ten drops, it has been beneficially employed in diarrhea, and in gastric irritability and spasm; the dose may be repeated every three or four hours. Externally, the oil has been found serviceable as an anodyne in rheumatism, toothache, and as a styptic in hemorrhage from wounds; in this latter instance care must be employed in its application, as Ergot has produced sloughing when applied to abraded surfaces on the lower animals. The oil will retain its properties for several years, if kept in well-closed bottles in a cool place, and excluded from light; an elevated temperature or a prolonged exposure to the sun's rays diminishes its activity.

Rye-bread, or Rye-mush, is laxative, especially to those unaccustomed to its use, and is sometimes taken to obviate costiveness. The dry flour allays the heat and itching of erysipelas and other affections of the skin, when applied upon the affected parts. In the form of poultice it is often applied to discuss tumors or swellings, or to hasten their suppuration when far advanced. Green Rye, when from six to ten inches high, made into a salve by simmering in fresh cream, I have known to cure several most inveterate cases of tinea-capitis; to be applied to the scalp twice a day.

Off. Prep.—Extractum Ergotæ Fluidum; Infusum Ergotæ; Tinctura Ergotæ; Vinum Ergotæ.

SELINUM PALUSTRE.

Marsh Smallage.

Nat. Ord.—Apiaceæ. *Sex. Syst.*—Pentandria Digynia.

THE ROOT.

Description.—This plant is the *Cnidium Palustre* of Sprengel, the *Peucedanum Montanum* of Koch, and the *Conioselinum* of Fischer. It has a simple, tapering, perennial *root*, with many long fibers. The *stem* is erect, four or five feet high, hollow, deeply furrowed, not hairy, branched and corymbose in the upper part, bright-purple at the base. The *leaves* are about five or six on the stem, alternate, remote, ternate with bipinnate divisions; the *leaflets* are opposite, deeply pinnatifid, dark-green, smooth, their segments linear-lanceolate, never quite linear, acute, entire, or trifid; the petioles are smooth, striated, dilated, and sheathing at the base, with a reddish membranous margin. *Umbels* large, horizontal, of numerous, angular, general and partial rays. *General bracts* several, lanceolate, pointed, dependent, not half the length of the rays, their margins membranous and partly colored; *partial ones* similar, rather longer in proportion, and often confluent. *Flowers* white, numerous, uniform, with involute petals. *Fruit* very light straw-color, four lines long, shining, obovate; the dorsal ridges very near each other, distinctly elevated, sharp, the lateral depressed and far within the broad thin margin; *vittæ of the commissure* subulate, straight, about half the length of the fruit.—*L.*

History.—This plant grows in marshes and boggy meadows in the north and middle of Europe. The root abounds in a white fetid, bitter juice, which hardens into a brown acrid resin; it is the part employed. It imparts its properties to water or alcohol.

Properties and Uses.—Marsh Smallage is emmenagogue, diuretic, and antispasmodic, but abandoned as an internal remedy on account of its caustic and dangerously poisonous properties. Ten or twenty grains, according to the patient's age, repeated every five hours, and after a time gradually augmented, have cured several cases of epilepsy; but it must not be used where abdominal obstructions exist, or where there is an exalted sensibility of the genital apparatus. In nervous and sanguine persons, especially those of irritable habits, it increases the violence of the disease. Two grain doses, repeated twice daily, have proved almost immediately beneficial in the convulsions of children during the process of dentition. The Marsh or Hemlock Parsley, *Selinum Canadense*, or *Cnidium Canadense* of Sprengel, and *Conioselinum Canadense* of Fischer, which grows in swamps, wet woods, and around the mouth of large rivers from Canada to Carolina, and westward, is a species of the above plant, and deserves a trial in the diseases just mentioned. It is a plant from two to four feet in height, somewhat resembling the Conium Maculatum, and having an angular, flexuous, hollow *stem*. The *leaves* are on large, inflated petioles, ternately divided; the divisions bipinnate, with linear-oblong, acute lobes. *Umbels* compound. *Petals* white, spreading. *Involucre* wanting, or two or three leaved. *Styles* slender, diverging. *Fruit* about two lines long, oblong-oval. *Vittæ* solitary in the dorsal intervals, two or three in the lateral. It flowers in August and September.—*W.*—*G.*

SEMPERVIVUM TECTORUM.

Common Houseleek.

Nat. Ord.—Crassulaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE LEAVES.

Description.—Houseleek has a fibrous *root* crowned with several rosaceous tufts of numerous, oblong, acute, keeled, fringed, extremely succulent *leaves*. The *stem* from the center of one of these tufts, is about a foot high, erect, round, downy, clothed with several, more narrow, sessile, alternate leaves, and terminating in a sort of many-flowered cyme, with spiked branches. *Flowers* large, pale rose-colored, without scent. *Segments of the calyx* twelve or more, with a similar number of *petals*, *stamens*, and *pistils*. *Offsets* spreading.—*L.*

History.—This is a well known perennial plant, a native of Europe, and is so succulent and hardy that it will grow on dry walls, and on the roofs of houses. It sends out runners with offsets, rarely flowering.—*W.* Its period of flowering is in August. It is much cultivated in some places. The fresh leaves are the parts used, they are thick, fleshy, mucilaginous, somewhat plano-convex, smooth, odorless, and of a mixed flavor, combining slight acidity with astringency. According to Thomson they contain a large proportion of supermalate of lime. This malate is less soluble in water than gum Arabic, is insoluble in alcohol, reddens vegetable blues, and yields a precipitate with alkalies, sulphuric, and oxalic acids. The juice of the leaves filtered with an equal quantity of alcohol, forms a beautiful, white, highly volatile coagulum.

Properties and Uses.—The fresh leaves are useful as a refrigerant, when bruised, and applied as a poultice, in erysipelatous affections, burns, stings of insects, and other inflammatory conditions of the skin. The leaf sliced in two, and the inner surface applied to warts or corns, and changed twice a day, will, it is said, positively cure them. The juice, applied locally, has cured ringworm, shingles, and many other cutaneous affections. Dr. A. Brown, of Cincinnati, recommends the following in many cases of deafness : fill a four or six ounce vial with the leaves of House-leek, cork it tightly, and place it within an unbaked loaf of bread. When the bread is baked remove the bottle, and there will be found a liquid of a soft, oily character, which may be dropped into the ear, say one or two drops every night. When applied it produces a singular, stimulating sensation. In erysipelas, he has found much benefit from the free internal use of the leaves bruised in milk and water, in quantity sufficient merely to stain the liquid. The bruised leaves applied as a poultice, have, in his hands, cured severe cases of shingles in twenty-four hours. The leaves also possess an astringent property, which is beneficial in many cases. May not the properties of this agent be owing to its lime-salt. It is somewhat singular that so useful an agent as malic acid (and some of its salts), has never been introduced as a standard medicine.

SENECIO AUREUS.

Life Root.

Nat. Ord.—Asteraceæ; *Tribe*, Senecionideæ. *Sex. Syst.*—Syngenesia Superflua.

THE ROOT AND HERB.

Description.—This plant is known by several other names, as *Ragwort*, *False Valerian*, *Golden Senecio*, *Squaw-weed*, and *Female Regulator*. It has an erect, smoothish, striate *stem*, one or two feet high, floccose-woolly when young, simple or branched above, terminating in a kind of umbellate, simple, or compound corymb. The *radical leaves* are simple and rounded, the larger mostly cordate, crenate-serrate, and long-petioled ; the *lower cauline leaves* lyre-shaped ; the *upper ones* few, slender, cut-pinnatifid, dentate, sessile or partly clasping, the terminal segments lanceolate. *Peduncles* subumbellate and thick upward. *Corymb* umbel-like. *Rays* from eight to twelve, four or five lines long, spreading. *Flowers* golden-yellow. *Scales* linear, acute, and purplish at the apex.— *W.*—*G.*

History.—This is an indigenous, perennial plant, growing on the banks of creeks and on low marshy grounds, throughout the northern and western parts of the Union, flowering in May and June. The root and herb are the officinal parts, and the medicine is peculiar to American practitioners, not being known to others; it yields its properties to water or alcohol. It has not been analyzed. There are several varieties of this species, which possess similar medicinal virtues, as the *Senecio Balsamitæ*, or *Balsam Groundsel*, with the *stem* and *peduncles* villous at base; the *leaves* few, small and distant, pubescent; the radical ones oblong, spatulate, or lanceolate, sometimes cut-toothed, tapering into the petiole; cauline ones lyrate or pinnatifid; *flowers* subumbellate. This variety grows in pastures and on rocky hills.—*W.*—*G.*

Another, the *Senecio Gracilis*, *Unkum* or *Female Regulator*, a slender state of the species, found on rocky shores; its *radical leaves* are orbicular, on long petioles, subcordate, crenate; cauline ones very few, remote, linear-oblong, dilated at the base, incisely dentate; *peduncles* very short, pilose, subumbelled; *involucre* smooth; *rays* few, very short. The *Senecio Obovatus* with the *radical leaves* obovate, crenate-serrate, petioled; cauline ones pinnatifid, toothed; *flowers* subumbelled long-peduncled, bracted, with a cavity under the receptacle like some other of the genus; *stem* somewhat glabrous. Found in the meadows, etc.—*W.*

Senecio Lanceolatus, found in shady cedar swamps in Vermont; it has all the *leaves* lanceolate-oblong, thin, sharply and unequally toothed, either wedge-shaped or somewhat cordate at the base, the upper cauline ones being pinnatifid-cut toward the base. Among these varieties, the *Senecio Gracilis* is considered the most efficient in uterine difficulties, and it is from this that the *Senecin* is prepared.

The whole herb is used. The root grows just below the surface of the ground, and runs along horizontally; it is from half an inch to six or eight inches in length, and about two lines in diameter, reddish or purplish externally, white-purplish internally, with an aromatic taste, and having scattered fibers. When dried, and mixed with the herb, it is found of various lengths from one-fourth of an inch to an inch or two, greenish-brown, or yellowish-brown externally, with very fine longitudinal lines, a few fibers attached, short fracture, presenting under the microscope a shining, waxy surface, with a central pale-purple substance surrounded by a greenish-yellow one, with a light-yellowish ring between the two; it is inodorous, and has a faintly bitter, herbaceous, peculiar, resinous taste, with a very slight degree of pungency. It yields its properties best to alcohol.

Properties and Uses.—Life Root is diuretic, pectoral, diaphoretic, tonic, and exerts a peculiar influence upon the female reproductive organs, which has given to it, especially the *S. Gracilis*, the name of *Female Regulator.* It is very efficacious in promoting the menstrual flow; and may be given alone, in infusion, or combined with equal parts of asarum and savin, in amenorrhea not connected with some structural lesion. It will also be found valuable in dysmenorrhea. In menorrhagia, combined with cinnamon and raspberry leaves, it has been found very serviceable, when administered during the intermenstrual period, as well as at the time of ovulation. It has proved an excellent diuretic in gravel and other urinary affections, either alone, or given in combination with other diuretics; and is said to be a specific in strangury. In pulmonary and hepatic affections it has proved advantageous; and taken freely, the decoction has effected cures of dysentery. This is one of our valuable agents in the treatment of female diseases. Dose of the decoction, four fluidounces, three or four times a day.

Off. Prep.—Decoctum Senecii; Extractum Senecii Fluidum. Senecin.

SENECIN.

Senecin.

THE CONCENTRATED ACTIVE PRINCIPLE OF SENECIO GRACILIS.

Preparation.—Make a saturated tincture of the root and herb of Senecio Gracilis, add to it an equal quantity of water, and distill off the alcohol; the Senecin remains in the water, which must be removed by filtration.

History.—Senecin thus prepared, is an oleo-resin of thick consistence, of a very dark-green color, appearing quite black in mass, having a peculiar, herbaceous odor, and a bitter, slightly pungent, persistent, and rather unpleasant taste. A portion of it, probably the oil, is soluble in alcohol, imparting a green color to the solution; on the addition of liquor potassa to the alcoholic solution, the Senecin is rendered wholly soluble, and if muriatic acid be added in small quantity, it changes the green solution to greenish-white, without precipitation. It is entirely soluble in sulphuric ether, forming a greenish solution, which is not precipitated by water, nor acetic acid. It is insoluble in water, but becomes soluble on the addition of strong alkaline solutions.

An Institute of the city of New York, publish a preparation as *Senecin*, the active principle of Senecio Gracilis; they state that it is a whitish-brown powder, agreeable to the stomach, and pleasant to the taste. I have never seen the article, nor do I know how it is prepared, but from a specimen of their Stillingin, I am inclined to view it as the oleo-resin triturated with sugar, or sugar of milk. And if such be the case, it shows the necessity that exists for practitioners to employ no secret agents, nor such as are prepared by secret processes, lest they be imposed upon in the article itself, as well as in the exorbitant price demanded for it.

Properties and Uses.—Senecin possesses the virtues of the plant from which it is obtained, in a high degree. It is, however, more especially employed in the treatment of female diseases, as amenorrhea, dysmenorrhea, and other uterine derangements. Combined with aletrin, caulophyllin, or cimicifugin, it will be found especially useful in these complaints. In menorrhagia it may be combined with geraniin advantageously; or its ethereal tincture may be administered in some astringent infusion. A pill of Senecin, aletrin, and sulphate of iron, will be found of benefit in chlorosis accompanied with amenorrhea. In dysmenorrhea it may be combined with extract of belladonna and sulphate of quinia. It is one of those agents which exert a tonic influence upon the uterus, thereby restoring its various functional derangements to a normal condition. Dose of Senecin, from three to five grains, three times a day.

SENECIONINE is a concentrated powdered preparation recently made by our manufacturers. Dr. F. D. Hill prepares it as follows: Make a tincture of the coarsely powdered leaves and roots of *Senecio Gracilis*, with alcohol of 76 per cent. Distill off the alcohol until the liquid is of the consistence of a fluid extract, add to it several times its weight of water, and precipitate with a solution of alum. Wash the precipitate to free it from the alum, and dry it in the open air without heat. It forms a dark-green powder, having a peculiar, herbaceous, strong, unpleasant, somewhat resinous and senna-like taste and odor, is insoluble in water, partially soluble in alcohol, and more so in ether. It possesses the virtues of the plant, and may be given in doses of from one to five grains, three or four times a day.

SESAMUM INDICUM.

Benne.

Nat. Ord.—Pedaliaceæ, *Lindley;* Bignoniæ, *Jussieu.* *Sex. Syst.*—Didynamia Angiospermia.

THE LEAVES AND SEEDS.

Description.—Sesamum Indicum is an annual plant with an erect, pubescent, branching *stem* from two to four feet in height. The *leaves* are ovate-lanceolate, or oblong; the lower ones trilobed and sometimes ternate; the upper undivided, irregularly serrate and pointed. The *flowers* are of a pale purple color, axillary, on short glandular pedicels. The *fruit* is an oblong, mucronate, pubescent capsule, containing numerous small, oval, yellowish seeds.—*W.*—*Wi.*

History.—There are two species of this genus, the *S. Indicum*, and the *S. Orientale*, both of which were originally from India, and are now much cultivated in several parts of Africa, West Indies, and in the Southern United States. That growing in the South is the S. Indicum, and flowers in August. The parts used are the leaves and seeds. The seeds are rather small, sulphur-colored, sometimes very dark, and contain a large quantity of a sweetish, odorless oil, which may be obtained by expression. It does not readily acquire rancidity, and forms an excellent substitute for olive oil. The negroes of the South make considerable use of the seeds as an article of diet. The leaves contain a large amount of mucilage, which may be procured by macerating them in water.

Properties and Uses.—A fresh leaf or two added to half a pint of water forms a pleasant, demulcent drink, very useful in catarrhal affections, acute diarrhea and dysentery, summer-complaint of children, and affections of the bladder, kidneys, and urethra. It may be drank freely. When the leaves are dried, their mucilage will be best extracted by water at 212° F. The mucilage forms an excellent soothing application in ophthalmia, irritations, cutaneous affections, etc.; but is inferior to slippery-elm. The oil may be used topically in eruptions of a scaly or bran-like character, or, it may be given internally in the same manner as olive oil to produce a laxative effect. It is stated that the natives of India employ it as an abortive, and to promote the menstrual discharge.

SEVUM.

Suet.

THE PREPARED FAT OF OVIS ARIES.

History.—Suet, *Mutton Suet* or *Sheep Tallow*, is the adipose matter of the domestic sheep, *ovis aries.* For medical purposes the kidney-fat is melted at a gentle temperature and then strained, in order to separate the membranous portions. It may be rendered still purer by heating it in water at 212°. It is somewhat similar in its properties to lard, but is harder and more compact, and melts at 103°. When fresh and well prepared it is white, nearly odorless, of a mild, oily taste, slightly soluble in alcohol but not in water, more soluble in ether; when long kept it is apt to become yellow, and rancid, and consequently should not then be used in pharmacy. According to Chevreul, it consists principally of stearin and olein, and a little margarin and hircin; and its ultimate composition is, carbon 78.99, hydrogen 11.70, oxygen 9.30. *Hircin* is a liquid oil, which yields *hircic acid* and glycerin when saponified; it is probably a mixture of capric and caprylic acids.

Mr. Wiggin, of Ipswich, has patented a mode for melting and purifying tallow and other kinds of grease. The process consists in heating the fatty substance in the state in which it is removed from the animal, with a small quantity of sulphuric acid of specific gravity 1.3 to 1.45. The acid dissolves the membrane and other impurities present, acquiring a dark color and thick syrupy consistence, while the fat separates in a state of great purity. It has been suggested that the fats obtained by this process were probably the fatty acids resulting from the decomposition of the neutral fats by the oil of vitriol; but Mr. Wiggin replies that in using the sulphuric acid at the density indicated, no decomposition of the fats was effected, and that no sulphurous acid was evolved in the process.

Properties and Uses.—Suet is nutritive and emollient, but not so easy of digestion as the fat of the pig or ox; yet made into a broth, with or without aromatics, and used in diarrhea, dysentery, and general debility. It is sometimes used as a dressing to blisters, and may be applied to most of the purposes for which lard is used, on account of its superior hardness, and higher melting point. For forming an ointment, it will be found preferable to lard, especially when it is to be applied to several forms of cutaneous disease.

SILPHIUM PERFOLIATUM.

Indian Cup-plant.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Necessaria.

THE ROOT.

Description.—This plant, also known by the name of *Ragged Cup*, has a perennial, horizontal, pitted *rhizome*, beset with radicles, and a large, smooth, square herbaceous *stem*, from four to seven feet high, and often branched above. The *leaves* are opposite, connate-perfoliate, ovate, coarsely toothed, abruptly narrowed into winged petioles at the base, the upper pairs forming a cup-shaped disk with their connate bases; they are from eight to fourteen inches long, by four to seven wide. The *flowers* are terminal, with from fifteen to twenty-five oblong, lanceolate, yellow *rays*, and a large dark-colored *disk*. *Heads* in a trichotomous cyme, the central on a long peduncle; *scales* ovate, obtuse, squarrose; *achenia* broadly ovate, winged, emarginate.—*W.*—*G.*

History.—This plant is common to the Western States, and is found growing in rich bottom or interval lands, bearing numerous yellow flowers in August. The root is the officinal part; it is large, long and crooked, and imparts its properties to water or alcohol. It has a persistent, acrid taste. There are several species of *Silphium*, which yield by exudation and incision a fine fragant and bitterish gum like Frankincense, white or amber color, and which is chewed by the Indians to sweeten the breath.

Properties and Uses.—Cup-plant is tonic, diaphoretic and alterative. A strong infusion of the root, made by long steeping, or an extract, is said to be one of the best remedies for the removal of aguecake, or enlarged spleen; it is also useful in intermittent and remittent fevers, internal bruises, debility, ulcers, liver affections, and as a general alterative restorative. The gum is said to be stimulant and antispasmodic. The *S. Gummiferum*, or Rosin-weed, and *S. Laciniatun*, or Compass-weed, are said to be emetic in decoction. They have effected cures in intermittent fever, and are beneficial in dry, obstinate coughs. Said to cure the heaves in horses. The dose of the powdered root of S. Perfoliatum is twenty grains.

SIMARUBA OFFICINALIS.

Simaruba.

Nat. Ord.—Simarubaceæ. *Sex. Syst.*—Decandria Monogynia.

THE BARK OF THE ROOT.

Description.—Simaruba, called in Jamaica *Mountain Damson*, is a tree with long, horizontal, creeping *roots*, and a trunk about sixty feet in height, alternately branched at the summit; the old bark is grooved and blackish; the young smooth, ash-colored, spotted yellow. The *leaves* are alternate and abruptly pinnate, with a long, naked petiole, sometimes nearly fourteen inches long; the *leaflets* are alternate, from two to nine on each side, about two inches long, oval, smooth, firm, mucronate, on short footstalks, and whitish underneath. The *flowers* are yellowish-white, some male, others female, mixed upon branched, scattered panicles, very small (Dr. Wright states that the male and female flowers, in Jamaica, are on different trees, or diœcious). *Calyx* small, cup-shaped, five-parted. *Petals* stiff, sharp-pointed, whitish, fixed between a membranous disk and the calyx. *Stamens* ten, nearly equal; *filaments* each arising out of a small, rounded, velvety scale; *anthers* oblong, incumbent. *Capsules* five, ovate, blackish, disjoined, placed on a fleshy disk, with a rather fleshy pericarp.—*L.*—*Wi.*

History.—Simaruba grows in Jamaica, Guiana, and other parts of South America. Notwithstanding it has been placed in the class and order Decandria Monogynia, *Linn.*, it is undoubtedly a pentagyn, for the styles arise from a five-lobed ovary, are separate from each other below, and terminate superiorly in five stigmas which are united. It is found in sandy places, flowering from October to January. The root-bark is the officinal part. The bark is rough, scaly, tuberculated, light, tough, yellowish-brown in its substance, but tinged with gray externally, odorless, not easily powdered, and intensely bitter.—*C.*—*Ed.* Water or alcohol takes up its properties. Morin found in it quassin, a brittle resin, an aromatic volatile oil having a benzoin-odor, woody-fiber, ulmin, an ammoniacal salt, malic acid, traces of gallic acid, malate and oxalate of lime, oxide of iron, and silica.—*P.*

Properties and Uses.—Simaruba is apt to excite vomiting and purging when taken in large doses. In smaller doses it is tonic, and may be used in infusion in all cases where simple bitter tonics are indicated. It may be used in all cases as a substitute for quassia. It was at first introduced to the profession as a calmative astringent in chronic dysentery and diarrhea. However, it merely acts as a tonic, proving very useful in weakened conditions of the digestive apparatus, but injurious in dysentery when improperly administered. The infusion is the best form for exhibition; a drachm or so may be added to half a pint of boiling water, and given in doses of a tablespoonful every two hours.

Foy recommends a compound infusion, made by placing in one pint of boiling water, two drachms, each of coarsely bruised Simaruba and wormwood; digesting for fifteen or twenty minutes; then straining and adding one fluidounce of syrup of gentian. The dose is a wineglassful two, three, or four times a day, and may be used in dyspepsia, anorexia, and in convalescence from intermittents. Simaruba is seldom used at present.

Off. Prep.—Infusum Simarubæ.

SINAPIS ALBA.

White Mustard.

SINAPIS NIGRA.

Black Mustard.

Nat. Ord.—Brassicaceæ. *Sex Syst.*—Tetradynamia Siliquosa.

THE SEEDS.

Description.—Sinapis Alba is an annual plant, with a thinly hirsute *stem*, from two to five feet high. The *leaves* are smoothish, lyrately pinnate, irregularly dentate, rugged, and pale-green; the lower lobes oblong and deeper, the terminal larger. The *flowers* are large, pale-yellow; *petals* ovate, with straight claws; *sepals* linear, green, equal at base, spreading. The *siliques* or *pods* are spreading, hispid, torose at the place of the seeds, nerved, shorter than the compressed, ensiform beak, and about four-seeded. The seeds are globose, large, and pale.—*W.*—*L.*

SINAPIS NIGRA is also an annual plant, with a round, smooth, striate, branching *stem* from three to six feet high. The *lower leaves* are large, lyrate, rough, variously lobed and dentate; the *upper* linear-lanceolate, smooth, entire, and pendulous; all petiolate. The *flowers* are small, sulphur-yellow; *calyx* spreading; *petals* obovate. The *pods* are very numerous, nearly an inch long, bluntly quadrangular, nearly even and smooth, appressed close to the rachis of the raceme, tipped by a small, short, four-sided style, but wholly destitute of the ensiform beak of the above species. *Seeds* numerous, small, globose, blackish-brown, veined.—*L.*—*W.*

History.—These plants are indigenous to Europe, and have been introduced into this country, where they are cultivated for use, and are found growing in old fields and waste places, flowering in June and July. The seeds of the *Black Mustard* are small, about the size of millet-seed, roundish, brownish-black externally, yellow within, and greenish in powder, of an acrid, burning, bitterish, oily taste, scentless when dry, but exhaling, when moistened, a penetrating, diffusive vapor, of a peculiar odor, and exceedingly irritating to the eyes and nostrils. White Mustard-seed is nearly three times as large as the other, yellow externally as well as in its substance, and of a similar but much more feeble odor and taste.—*C.* Its powder is yellow. Both kinds of Mustard-seed are employed in medicine in the form of flour, and the white seeds are likewise used entire. Table Mustard is prepared from the white seeds; but the finest quality is prepared with the purest flour of both the white and black, in nearly equal quantities. An English quality of table Mustard is said to be prepared by mixing 145 pounds of Mustard flour, made by grinding together two bushels of black and three of white seed, with fifty-six pounds of wheat flour, to diminish the pungency, and two pounds of turmeric to improve the color; then, to restore the acrimony without the pungency, one pound of chilly pods and half a pound of ginger is added. The officinal flour of

Mustard should be made with the black and white seeds only, without any adulteration.

By expression, both kinds of seeds yield a fixed oil, thick, like castor-oil, of a greenish-yellow color, sp. gr. 0.92, bland, and nearly free of odor; it is known as oil of Mustard, and affords hydrate of erucaic acid when saponified.—*Chem. Gaz., VII.* It constitutes about 28 per cent. of the seeds, and has been used as a purgative and vermifuge.

When the fixed oil has been separated from Black Mustard-seeds, by expression, they give, when digested with water, and then distilled, the *volatile oil of Mustard*, $C_8 H_5 NS_2$, which is not the case with the White Mustard-seeds. It is colorless at first, but afterward yellowish or brownish, has a specific gravity of 1.015, a most penetrating odor, and is of an intense, penetrating, pungent acridity. It is scarcely dissolved in water, but quite so in alcohol or ether. Its boiling point is a little over 290° F., and when treated with alkalies, it forms alkaline sulpho-cyanides; according to Dr. Will it may be viewed as a sulpho-cyanuret of allyle, $C_6 H_5 + C_2 NS_2$. The seeds owe their properties to this oil.—*C.*—*Chem. Gaz.*, *III.*, 253, *Nos.* 62–64.

From the investigations of chemists, Black Mustard-seeds have been found to contain myronate of potassa, myrosin, fixed oil, a pearly, fatty matter, gummy matter, sugar, coloring matter, sinapisin, free acid, peculiar green matter, salts. *Myrosin* is an indifferent nitrogenized body, bearing considerable resemblance to vegetable *emulsin*, but entirely distinct from it. When the seeds are bruised and macerated in water, the myrosin producing fermentation, effects an influence upon the mixture which develops the volatile oil. If hot water be at first used, the myrosin would be coagulated, and its influence be lost; in this respect it resembles emulsin, as well as in its coagulability by acids and alcohol. It can not be procured from Black Mustard-seeds, because the presence of myronic acid, when in contact with water, changes it into volatile oil. It may be obtained from White Mustard-seeds by macerating them in cold water, filtering, evaporating, to the consistence of molasses, not raising the heat above 104°, and dissolving the residue in alcohol; the myrosin is deposited, and must be separated, dissolved in water, and carefully evaporated by a gentle heat; it almost always contains a portion of albumen.

Myronate of potassa is a body not yet fully studied. It may be obtained from Black Mustard-seed, by freeing them of their fatty oil by expression, and then completely exhausting them with alcohol. Remove the alcohol by filtration and expression, and digest the seeds with water, which dissolves the myronate of potassa. Evaporate the watery solution to the thickness of extract, and treat the residue with weak alcohol; carefully evaporate this and the myronate of potassa is obtained in crystals, which may be purified by washing them with weak alcohol. They are not dissolved by absolute alcohol, but are by water, are permanent in the air and bitter.

Myronic acid is a non-crystalline, permanent, odorless, bitter, and sourish mass, of a syrupy consistence, containing nitrogen, carbon, hydrogen, oxygen, and sulphur; it is dissolved by water or alcohol, but not by ether. With alkalies it forms crystalline salts, which, in solution with myrosin, afford volatile oil. It may be obtained from the myronate of potassa by dissolving it in a solution of tartaric acid, evaporating to a syrupy consistence, and separating the bitartrate of potassa by diluted alcohol. The acid remains in the solution, from which it may be procured by evaporation.

Sulpho-sinapisin, $C_{24} H_{22} NS_2 O_7$, may be procured from the White Mustard-seeds after the separation of their fixed oil, by forming an aqueous decoction with them, evaporating this to the consistence of thick syrup, adding to it seven or eight times its measure of absolute alcohol, filtering, and removing the alcohol by distillation until a syrupy mass is left; as this cools, crystals of sulpho-sinapisin are deposited. Re-solution in alcohol and recrystallization will render them still more pure. They are white, bitter, not acid, and soluble in water, alcohol, or ether. Acids, oxides, and salts acting upon them, give rise to hydro-sulphocyanic acid. Myrosin acting upon them develops this acid, and a fixed, acrid principle, which is reddish, unctuous, pungent, and sulphureted, and which is found to be produced when White Mustard-seeds are added to water.

Sinapisin, is an indifferent substance obtained from Black Mustard-seeds, by Simon. A strong absolute alcoholic tincture of the seeds was evaporated, and the sinapisin was obtained from the residue by ether. It forms in white micaceous crystals, is volatile, dissolved by alcohol, ether, and the oils, but not by alkalies and acids, and is not changed into volatile oil by the action of myrosin.

Mustard is most energetic, whether intended for internal or external use, by being mixed with water at ordinary temperatures. If boiling water, spirits, vinegar, or other acids be mixed with it, the myrosin contained in it is coagulated to a greater or less extent, thus preventing the formation of those pungent principles to which its properties are owing. For the above statements I am indebted to Francis's Chemical Gazette, Bell's Pharmaceutical Journal and Transactions, which contain excellent abstracts from foreign papers; also to the Journal de Pharmacie, the American Journal of Pharmacy, and Pereira's Materia Medica.

Properties and Uses.—Mustard is an irritant, stimulant, rubefacient, vesicant, and diuretic. It is used in small quantities, internally, as a condiment, and mild but efficient excitant of the organs of digestion. In drachm doses it acts as an emetic, and will thus be found serviceable in cases of gastric torpidity, poisoning by narcotics, to stimulate the stomach, and to aid other emetics in fulfilling their indications. In large doses, the volatile oil is poisonous, causing inflammation of the stomach and bowels, and impairing the normal character of the fluids of the system by its absorption. Externally, it quickly excites redness of the skin, and if too long applied, inflammation, ulceration, and even sloughing; but if removed in time, the redness is succeeded only by induration of the cuticle, and occasionally desquamation. The stinging pain which remains after the removal of the Mustard, may be mitigated by sponging the part with cold water, or dropping ether on it. Sinapisms are beneficially applied over the abdomen and spine, in gastric and enteritic inflammations, and over the epigastrium, in vomiting from irritability of the stomach; also to the spine, wrists and ancles, to arouse the system in apoplectic and comatose conditions, and in typhus fever; to the feet and legs, for pains in the head during fevers and other diseases, and in determinations to the head; and to various parts for removing pain, mitigating local inflammations, or arousing from stupor. In the treatment of cholera, Mustard is an excellent rubefacient application, likewise in dyspepsia and obstinate constipation. Applied to the breasts it will often relieve suppression of the menses, as well as menorrhagia; to be applied intermittingly. A prolonged application of a Mustard cataplasm causes blistering, with even ulceration and gangrene. The *volatile oil of Mustard* is a powerful rubefacient and vesicatory; and in the dose of two drops, several times a day, in some mucilaginous vehicle, it is a good diuretic, useful in dropsy, and has been serviceable in colic. A liniment composed of one part of the oil, dissolved in sixteen parts of alcohol, or in ten parts of olive or almond oil, is a good substitute for a sinapism. White Mustard-seeds, taken entire, were formerly used as a favorite tonic in dyspepsia. Dose of Mustard, as an emetic, one, two or three drachms, with six or eight ounces of warm water.

Off. Prep.—Cataplasma Sinapis.

SISYMBRIUM OFFICINALE. (*Erysimum Officinale.*)

Hedge Mustard.

Nat. Ord.—Cruciferæ. *Sex. Syst.*—Tetradynamia Siliquosa.

THE SEEDS AND HERB.

Description.—This is an annual, herbaceous plant, with a round, more or less hairy, branching *stem*, from one to three feet high. The *leaves* are runcinate; the lower ones from three to eight inches long by one to three wide, the lower segments placed at right angles to the midvein, or pointing backward, the terminal segment largest; upper ones in three lanceolate segments placed at right angles. The *flowers* are small, yellow, and terminate the slender, virgate *raceme*, which becomes one or two feet long. The *siliques* or *pods* are subulate, erect, sessile, and closely appressed to the rachis. *Seeds* in a single row in each cell, ovoid, marginless.—*W.*—*G.*

History.—This is an unsightly weed, inhabiting the United States and Europe, growing in waste places, and flowering from May to September. Its taste is herb-like, faintly resembling that of mustard. The seeds, leaves, and flowering-tops are used; the former possess the greatest pungency. Water extracts its active properties by infusion.

Properties and Uses.—It is reputed expectorant, and has been used with advantage in hoarseness, old coughs, asthma, and ulcerated throat; likewise said to exert some influence in urinary obstructions as a diuretic. The powdered seeds may be used internally in the dose of from five to thirty grains, or an infusion may be given every two or three hours in tablespoonful doses. The juice rubbed up with sugar or honey is also used. The *Sisymbrium Sophia* or Flix Weed, with bipinnately-divided *leaves*, the lobes oblong-linear, incised; *pedicels* four times the length of the calyx; *petals* smaller than the sepals,—is a very intensely pungent plant. Its seeds have been recommended in gravel, and to remove worms; and a fomentation of the leaves as an application to obstinate ulcers.

SMILAX OFFICINALIS.

Sarsaparilla.

Nat. Ord.—Smilaceæ. *Sex. Syst.*—Diœcia Hexandria.

THE ROOT.

Description.—Smilax Officinalis has a twining, angular, prickly, and shrubby *stem;* the young shoots being unarmed. The *leaves* are ovate-oblong, acute, cordate, netted, five or seven nerved, coriaceous, smooth, a foot long, and four or five inches broad; the young ones lanceolate, oblong, acuminate, and tri-nerved. The *petioles* are an inch long, smooth, bearing tendrils above the base. *Flowers* unknown. This plant grows in New Granada, on the banks of the Magdalena, near Bajorque, and is called *Sarzaparilla* by the natives. Great quantities of it are sent to Mompox and Carthagena, whence it is shipped for Jamaica and Cadiz. Pereira supposes this to be the *Jamaica Sarsaparilla*, the best and most valuable kind in commerce.—*L.* This kind of Sarsaparilla very much resembles the Honduras, and is seldom, if ever, seen in this country, at least under the above name. Pereira describes it as occurring in that country in bales of from 60 to 80 pounds each, which are composed of the long roots folded and made up into bundles about a foot and a half long, and six inches broad. Its cortex is brownish, with an orange-red tint, and when chewed it tinges the saliva, giving at first a slightly mucilaginous and bitter taste, followed by some acrimony. It contains a less proportion of starch than the Honduras root, and considerably more extract.

SMILAX SYPHILITICA has a round, smooth *stem*, furnished only at the knots with from two to four short, thick, straight prickles. The *leaves* are a foot long, oblong-lanceolate, acuminate, shining, coriaceous, three-nerved, and terminated by a long point.—*L.* Humboldt and Bonpland discovered this plant in New Grenada, on the river Cassiquiare, between Mandavala and San Francisco Solano.—*P.*

SMILAX PAPYRACEA, has a four-cornered or plane-angular, polished, prickly *stem; leaves* somewhat membranous, oval-oblong, obtuse at both ends, or usually pointletted at the apex, quite entire, unarmed, five-ribbed, with three more prominent ribs. *Cirrhi* inserted beneath the middle of the petiole. This plant grows in the province of Rio Negro and neighboring places, and yields the Brazilian Sarsaparilla.

SMILAX MEDICA has an angular *stem*, armed with straight aculei at the joints, and a few hooked ones in the intervals. The *leaves* are of the texture of paper, smooth, bright-green on each side, cordate, auriculate, shortly acuminate, five-nerved, with the veins of the under side prominent; they are variable in form, being ovate, somewhat panduriform, auriculate, and somewhat hastate, with the lobes of the base obtuse, sometimes obsolete, sometimes divaricating; their edge not straight, but as if irregularly crenate; *petioles* and *midrib* armed, when old, with straight, subulate prickles. *Peduncles* varying in length from three lines to an inch or more. *Umbel* about twelve-flowered, with the pedicels about three lines long. Schiede found this plant on the east slope of the Mexican Andes, where the root is gathered and then carried to Vera Cruz; it is supposed to furnish the Vera Cruz Sarsaparilla of commerce.—*L.* The plant grows in Papantla, Tuspan, Nautla, etc., and is usually shipped at Vera Cruz and Tampico, being put up in large bales weighing from one hundred and fifty to two hundred pounds.

SMILAX SARSAPARILLA has a stout, somewhat flexuous, slightly quadrangular *stem*, with a few scattered, hooked prickles above. The *leaves*, are unarmed, elliptical-ovate, cuspidate, abruptly contracted at each end, with three strong veins, and two lateral smaller secondary ones, glaucous beneath, two or three inches in diameter, and upon short, margined *petioles*, with two long tendrils at their bases. The *flowers* are in small, thin umbels, of three or four yellowish-white; *peduncles* longer than the short petioles. The *berries* are three-seeded, red, according to *Woodville;* black to *Pursh.* This is a native of the Southern United States, growing in swampy thickets, etc., and flowering from May to August.—*W.* It does not furnish any of the Sarsaparilla of commerce, and is supposed to be destitute of any active medicinal properties, but on what grounds I do not know. There is a plant in the South extensively known as *Bamboo Brier*, the root of which I have much used in practice, and with decidedly more successful results than from the use of any of the Sarsaparillas of the shops—from the description of the plant, given to me by those who have seen it growing, I am inclined to believe it is one of the species of Sarsaparilla, probably *S. Sarsaparilla*, and I invite the attention of physicians to it, as a remedy in every respect superior to the usual commercial article, especially in primary and secondary syphilitic diseases.

SMILAX CHINA has a hard, large, knotty, uneven *rhizoma*, brown or blackish internally, whitish within. The *stem* is tapering, slightly prickly, growing two or three feet high without support, but acquiring a greater length if scrambling among bushes. The *leaves* are thin, membranous, roundish, five-nerved, acute or obtuse at each end, and mucronate at the point; the *stipules* are distinct, obtuse. *Umbels* small, ten-flowered greenish-yellow. *Fruit* red, about the size of a *bird cherry*.—*L.* This plant grows in eastern Asia, and furnishes the *China-root* of commerce. It has been used as a substitute for Sarsaparilla, but is not found to be as active. It occurs in large, ligneous, knotty pieces, from two to six or more inches in length, and one or two inches in diameter; externally it is grayish-brown, internally a light flesh, or yellowish-white color. It is inodorous, and has a slightly astringent taste.—*P.*

History.—The Sarsaparillas are all climbing plants, having aculeate stems: there are many species, but they do not all possess medicinal activity. Among several species growing in Guiana, Hancock found but one which was endowed with any virtues as a medicine. In commerce several kinds of Sarsaparilla are found, but it is very difficult to refer satisfactorily to the species which furnish them. The Mexican and South American Sarsaparillas, have numerous long, delicate roots proceeding from one caudex or rhizome; they are usually taken from the ground with the caudex attached, and are frequently packed in this manner for exportation. There are other varieties, beside those above named, which are occasionally met with in our markets, among which may be named the *Caraccas Sarsaparilla*, which is imported in heavy packages. The roots frequently contain large proportions of starch. Much care seems to be taken in preparing them for the market. There are several other varieties of an inferior character, which it is unnecessary to notice.

Honduras Sarsaparilla is the kind most esteemed and more commonly employed. It is imported from Belize, and other parts of the Bay of Honduras, in parcels two feet or more in length; the roots are folded into a kind of hank, and held closely together by passing some of the roots transversely around those forming the parcel. These parcels, weighing from two to twenty pounds are formed into large packages, weighing from eighty to one hundred and twenty pounds, which are partially enveloped with hide or skin. The roots have a few rootlets attached, are of a grayish or reddish-brown color, with a very mealy cortex.—*P.*

The Sarsaparilla of commerce, consists of very long roots, having a thick bark of a grayish or brownish color when the epidermis is removed, somewhat corrugated lengthwise, with a thin internal woody portion, and a pithy center, which is frequently very amylaceous. Sarsaparilla has scarcely any odor, but possesses a mucilaginous taste, with a slowly developed and persistent bitterish acridity. Those roots which have a deep orange-red tint are preferred, but more especially those whose taste is acrid and nauseous; the stronger this is, the better is the quality of the root. Water, either cold or hot, and also diluted alcohol, extracts its medicinal virtues, which, however, are materially injured by too great, or long continued heat. Hancock, in his remarks upon Sarsaparilla, published in the *Transactions of the London Medico-Botanical Society*, 1829, observes that after having exhausted the root with water, he subsequently digested it in spirits for a few hours with a gentle heat, then added hot water, and by pressure obtained a much more acrid infusion than that made with water alone. There is no doubt that alcohol added to infusions of the root will increase their medicinal power. Sarsaparilla has undergone several analyses; according to Batka, it contains a crystalline matter (*parallinic acid*), a coloring crystalline matter, an essential oil, gum, bassorin, starch, albumen, extractiform matter, gluten and gliadine, fibrous and cellular tissue, pectic acid, acetic acid, and several salts of lime, potassa, magnesia, and oxide of iron. Thubeuf found in it a crystalline substance (*salseparin*), a coloring matter, a resinous matter, ligneous matter, starch, chloride potassium, nitrate potassa, fixed aromatic thick oil, and waxy substance.—*P.*

In 1825 Pallota extracted from Sarsaparilla root a peculiar substance to which he gave the name of *pariglin* or *parillina.* This was afterward examined by Folchi, and called by him *smilacin.* Thubeuf followed next, and gave it the name of *salseparin.* Batka published a set of experiments on the Sarsaparilla root, and drew as a conclusion from them, that the peculiar substance distinguished by the above names was an acid, to which he gave the name of *parillinic acid.* Poggiale has examined the statements of his predecessors, and has come to the conclusion, that the *pariglin*, *smilacin*, *salseparin*, and *parillinic acid* are all one and the same substance under different names. To this substance, the properties of which he has examined, he has given the name of *salseparin.* Thubeuf obtained it by the following process: Exhaust the root with warm alcohol. Distill off about six-sevenths of this tincture. Digest the residue for a day or two with animal charcoal, and filter while the liquid is still hot. On cooling, the smilacin is deposited in crystals. By repeated solutions and crystallizations, it is obtained pure. If we evaporate the mother-waters to dryness on the water-bath, and treat the dry residue with hot water, resin and fatty matter are left behind. The aqueous solution being evaporated to dryness, and the residue treated with alcohol, we may obtain more smilacin by evaporating the alcohol. Smilacin, when thus obtained, is a white powder, which, when dissolved in alcohol, and left to spontaneous evaporation, crystallizes in fine needles. They are white and tasteless while solid, but have a bitter taste when dissolved. They are heavier than water, dissolve with difficulty in cold, but more easily in water at 212° F., are soluble in hot or cold alcohol, hot ether, and in volatile oils. They are soluble in dilute acid and alkaline solutions, and are thrown down when the acids or alkalies are saturated. Pallota swallowed thirteen grains of it, and found it to occasion nausea, vomiting, diminution of the frequency of the pulse, and diaphoresis.—*T.* Should this prove to be the active principle of the root, its proper name would be *Sarsaparillin.* Souberain's process for procuring parillin is to exhaust Sarsaparilla with alcohol, and to the filtered tincture add a solution of acetate of lead, until it no longer causes a precipitate. Should there be an excess of lead, remove it by the addition of a few drops of sulphuric acid. Filter and distill. The watery part left in the retort, on cooling, deposits the parillin as a white powder. The liquors here are in a great measure decolorized by the precipitation; they are less viscous, and deposit the parillin with great facility. By saturating the mother-liquor with chloride of sodium, more parillin may be obtained. Like the preceding it is neutral and forms a lather with water.

Dr. Berthold Seeman, in a communication to the Linnean Society, Dec. 6th, 1854, stated as the conclusions at which he had arrived, after a careful investigation of the subject, that the greater proportion of Sarsaparilla imported under the commercial names of "Lisbon," "Jamaica," or "Brazilian" and "Guatemala" or "Red Paraguay" Sarsaparilla is the produce of one species only, the Smilax Officinalis; and further, that the S. Medica, and S. Papyracea are identical with it. The difference in the roots as to the quantity of rootlets or beards attached, is clearly the result of the rootlets having been removed by some mechanical means or other, before the article reaches the market. The condition indicated by the chief pharmacological distinction into "mealy" and "non-mealy" samples, he believes to depend on the age of the roots, and on the locality in which they are collected. While, however, the botanical source of the various Sarsaparillas was thus held to be identical, the value of the commercial distinctions, as such, was admitted; for as long as the Brazilian collectors continue to strip the roots of their beard and put them up in long bundles, there will always be Lisbon Sarsaparilla; as long as the inhabitants of the Spanish Main continue to preserve the rootlets we shall have Jamaica Sarsaparilla; and as long as the climate and other physical conditions of Gautemala remain unchanged, we shall continue to receive from that locality Sarsaparilla distinguished by its abundance of starchy matter.—*Pharm. Jour. & Trans. XIII.*, 385.

Sarsaparilla should never be purchased unless, after having chewed it for a few minutes, it leaves a distinct persistent pungency or acrimony in the mouth and fauces, without this effect it can not be relied upon as an efficient article.

Properties and Uses.—Sarsaparilla is generally considered as an alterative, though stated by some to possess diuretic, diaphoretic, and emetic properties. Its mode of action, however, is not well understood, as it effects normal changes in the system without any appreciable change in the operation of the various organs. No medicine has, probably, ever passed through so many changes of popularity, having been at various times most highly lauded as an efficient alterative, and as often been pronounced inert. There is no doubt, however, that when properly prepared, its exerts a favorable influence over the system. The diseases in which it has been more particularly recommended, are inveterate syphilis, pseudo-syphilis, mercurio-syphilis, and struma in all its forms. It has been used in several chronic diseases, as of the skin, rheumatic affections, passive general dropsy, gonorrheal neuralgia, and other depraved conditions of the system, where an alterative is required. A drink is made in Angostura, which enjoys much reputation there as an alterative beverage; it is made of Rio Negro Sarsaparilla one pound, rasped guaiac wood six ounces, aniseed and bruised liquorice root, of each two ounces, mezereon root-bark one ounce, molasses one pound, and half a dozen bruised cloves; pour upon these articles two gallons of boiling water, and shake the vessel three times a day. As soon as fermentation begins, it may be taken in doses of four fluidounces two or three times a day.—*C.*—*Trans. Med. Bot. Soc.* 1829. At the present day, Sarsaparilla is but little used as above; the *Stillingia Sylvatica* being found greatly superior to it in medicinal efficacy, is employed in preference. Dose of Sarsaparilla in powder, thirty grains, three or four times a day; of the infusion or syrup, four fluidounces.

Off. Prep.—Decoctum Sarsaparillæ; Extractum Sarsaparillæ Fluidum; Infusum Sarsaparillæ; Syrupus Sarsaparillæ Compositus.

SODIUM.

Sodium.

Preparation.—Sodium is obtained by a process exactly similar to that described for potassium, substituting acetate of soda for cream of tartar. As Sodium does not combine with carbonic oxide, the process is much more productive than in the case of potassium.

History.—Sodium was first described by Sir Humphry Davy in 1808, who succeeded in obtaining it by a process similar to that which enabled him to procure potassium from potassa, viz.: by decomposing soda with galvanic power. Gay-Lussac and Thenard afterward succeeded in procuring it in large quantities from soda by the same process as that by which they had obtained potassium, that is, passing potash through iron turnings, heated to whiteness in a gun barrel covered on the outside with clay to protect it from the action of the fire. But it is not so easy to obtain Sodium in this way as potassium. Sodium is the metallic basis of the alkali, soda; it is a white metal, having a color intermediate between that of silver and lead. At the common temperature of the air it is solid and very malleable, and so soft that pieces of it may be welded together by strong pressure. It retains its softness and malleability at the temperature of 32°. It is an excellent conductor of electricity, melts at 194°, and at nearly a red heat, volatilizes with colorless vapor. Its affinity for oxygen is inferior to that of potassium, nevertheless it oxidizes readily when exposed to the air, and is converted into caustic soda, and consequently should be kept in naphtha. When Sodium is thrown upon water it does not take fire as potassium does; it moves rapidly over the surface of the water, absorbs its oxygen and liberates its hydrogen, thus almost immediately decomposing the water. If the water, however, be thickened with gum, or, if there be only a few drops of water, the action of Sodium is attended with flame of a yellow color. It forms with oxygen three oxides, the protoxide, or soda, the suboxide and the peroxide, the most important among which is the protoxide, which is capable of forming numerous salts. The specific gravity of Sodium is 0.97, at 4° F.; it is rather hard, its symbol is Na, and its equivalent weight 23.3.

Sodium constitutes two-fifths of all the sea-salt existing in salt water, and is also found in the water of springs, rivers, and lakes in almost all soils, and in the form of rock-salt. Sea-salt is a compound of Sodium with chlorine, $Na\,Cl$. It is also contained in many minerals, sea-plants, and in most animal fluids. Sodium and the salts of the protoxide burn with a more or less rich yellow-colored flame.

The various medicinal preparations formed from the protoxide of this metal, will each be described under its appropriate head, hereafter.

Beside magnesia, and sugar of milk, there has been found in some of the fraudulent so called " concentrated remedies " which have been manufactured of late years, salt, etc. If a small portion of the fraudulent article be heated on platinum before a blowpipe, instead of leaving the white incombustible substance left when magnesia is the adulteration, the residue will be found to fuse at an elevated heat. Place a small quantity of this fused substance on a glass slide, and dissolve it in a drop or two of water, if it be carbonate of soda, the solution will restore the blue color to reddened litmus paper. To the drop of this solution add a drop of a solution of chloride of platinum, and carefully evaporate over an alcohol lamp. Before the fluid is entirely evaporated, place it under the microscope, when if the residue first obtained by calcination be soda, large, very transparent prisms of an indefinite length will be seen, which possess the faculty, in a high degree, of polarizing light; they are very soluble in water.

SODÆ ACETAS.

Acetate of Soda.

History.—Acetate of Soda, formerly called *Crystallized Foliated Earth of Tartar*, was first obtained in 1767 by Meyer. It is usually prepared by makers of pyroligneous acid. The impure pyroligneous acid is neutralized with lime, forming an acetate of lime; this is decomposed with a strong solution of sulphate of soda, crystallizing the acetate of soda formed thus through double decomposition, and purifying the crystals, by melting and again crystallizing them.—*C.* It may also be obtained by the following process of the Dublin College: "Take of Crystallized Carbonate of Soda of commerce *one pound* (avoird.), or *a sufficient quantity;* Acetic Acid of commerce, sp. gr. 1.044, *one pint* (Imperial measure). To the acid, placed in a porcelain capsule, add by degrees the Carbonate of Soda, and, taking care that there shall be a slight excess of acid, evaporate the resulting solution till a pellicle begins to form on its surface, and set it by to crystallize. The crystals, when drained of the mother-liquor, and dried by a short exposure to the air on a porous brick, should be inclosed in a well-stopped bottle.

This process is very similar to the one laid down by Wittstein, in which the acetic acid drives off the carbonic acid and forms with the soda, Acetate of Soda. 1772 parts of acetic acid, sp. gr. 1.045 (containing 36 per cent. pure acid), are saturated by 1790 parts of carbonate of soda. To save fuel the strongest commercial acid should be employed. The salt dried in the warm is anhydrous. Acetate of Soda is met with either in amorphous foliaceous masses of interlaced crystals, or crystallized in striated needles, or large fluted oblique rhombic prisms variously modified. It is white, permanent in ordinary air, but effloresces and becomes anhydrous in warm and dry air. It has a pungent, saline taste, approaching to bitter, not very unpleasant. It requires about two and a half parts of water at the ordinary temperature to dissolve one part, its own weight of boiling water, and twenty-four parts of alcohol; its specific gravity is 2.1. A temperature of 550°, cautiously managed, drives off its water of crystallization without the loss of any acid; but at 600° the acetic acid is decomposed, and a mixture of carbonate of soda and charcoal is left. Sulphuric acid drives out the acetic acid, and combines with the soda to form a sulphate. Litmus-paper is not affected by Acetate of Soda, nor is its solution precipitated by chloride of platinum, which will serve to distinguish it from a salt of potassa. It contains one equivalent of acid 51.48, one of soda 31.3, and six of water $54 = 136.78$. Its formula is $Na\,O\,\bar{A}$, and its equivalent weight 82.

Properties and Uses.—Acetate of Soda possesses the diuretic properties of acetate of potassa, but in a feebler degree. Its dose is from twenty grains to one or two drachms.

SODÆ BORAS.

Borate of Soda. Borax.

History.—Borax is an abundant natural production found in several parts of the world, especially in the waters of various lakes in Persia and Thibet; on the borders of which it is left in impure crystals during the dry season. In its natural or crude state it is collected in large masses, which are broken and dried, and are imported under the name of *Tincal* or *crude* borax. It is also met with in the mines of Potosi; and is largely manufactured by the direct combination of boracic acid with soda. The crude Borax or Tincal comes from Thibet and various parts of Asia by the way of Calcutta; there are three varieties of it, viz.: Indian Tincal, which is met with in small crystals; Bengal or Chandenagor Tincal, which is in large, well-defined, hexædral prismatic crystals; and Chinese Tincal, which is imported in crusts and masses, and is imperfectly refined. The Tincal met with in commerce is in six-sided prisms, flattened, opaque, of a waxy luster, coated with a soapy substance, or occasionally with argillaceous matter, and usually of a yellowish, bluish or greenish color. It is generally purified previous to being made use of. This was for a long time done by the Dutch only, who contrived to keep the process a secret; but in 1818, Robiquet and Marchand published a process for its purification, since which Tincal is refined in several countries. Several methods are employed; one is to calcine the Tincal, which destroys the fatty or saponaceous matter with which it is coated, and afterward dissolve and crystallize the salt. A second method is to wash the Tincal several times with cold lime-water, so as to destroy the alkaline soap on its surface, and convert it into an insoluble calcareous soap; then dissolve the salt in hot water, and decompose any remains of the alkaline soap in the solution by a little muriate of lime; finally strain, evaporate, and crystallize by very slow cooling.—*C.* A third method is to wash the Tincal with a solution of caustic soda, then dissolve it in water, add some caustic soda to the solution to precipitate earthy matters, decant, and evaporate the clear solution. Borax is usually crystallized in wooden vessels, lined with lead, and which have the form of short inverted cones.—*P.*

Recently, considerable of the refined Borax of commerce is prepared from boracic acid, which exists in abundance in certain lagoons and hot springs in Tuscany, which are stated to furnish about two and a half millions of pounds annually. It is impure when first obtained, containing in 100 parts 76.5 crystallized boracic acid, 8.5 sulphate of ammonia, 2.6 sulphate of magnesia, 5.0 sulphate of lime, 1.2 silica, 1.3 sulphuric acid, 6.6 water, beside various other impurities. Carbonate of soda is dissolved in water contained in tubes lined with lead and heated by steam ; to this coarsely pulverized boracic acid is added. The evolved gas is passed through sulphuric acid, to detain any carbonate of ammonia which may be contained in it. The liquor is boiled, and allowed to stand for ten or twelve hours, and is then drawn off into wooden crystallizing vessels lined with lead, in which crude or rough Borax is deposited. This is refined by dissolving it in water, contained in a tube lined with lead and heated by steam ; adding more carbonate of soda, and crystallizing. The crystals are allowed to drain, and when dry are packed in chests, forming the *common* or *prismatic Borax. Octohedral Borax* is obtained by using more concentrated solutions. Sautter has patented a dry process for preparing Borax. It consists in mixing 38 parts of pure dry boracic acid with 45 parts of crystallized carbonate of soda, and placing the mixture upon wooden shelves in a heated room. The boracic acid expels the carbonic acid and some water, and combines with the soda.—*P.*

Borax crystallizes in large, oblique, rhombic prisms, or in flattened, six or eight-sided prisms, usually terminated by two or four converging planes; it is white, translucent, shining, inodorous, and possessed of a peculiar sweetish, slightly saline and somewhat alkaline taste. Its reaction is alkaline. It effloresces gradually in the air. It dissolves in twelve parts of cold, and two of boiling water; sulphuric acid added to a hot concentrated solution, causes a precipitate of colorless pearly crystalline scales of boracic acid, which colors the flame of burning alcohol green. At a gentle heat, Borax fuses in its water of crystallization, swells, and ultimately becomes an anhydrous salt, called *calcined Borax*, with the loss of four-tenths its weight. At a still higher temperature, it fuses again, and on cooling forms a soluble transparent mass called *vitrified Borax*, or *glass of Borax*, which is anhydrous Borax, $Na\ 2\ B\ O_3$. *Octohedral Borax* $Na\ O\ 2\ B\ O_3\ 5\ HO$, contains only five equivalents of water, and on this account offers several advantages over the prismatic variety. *Boracic acid*, BO_3 is composed of one equivalent of boron 10.9, and three of oxygen $24=34.9$. *Borax* consists of two equivalents of acid 69.8, one of soda 31.1, and ten of water $90=190.9$; its formula is $Na\ O\ 2\ B\ O_3+10$ Aq., and its equivalent weight is 101. Boracic acid is so feeble an acid that even the two equivalents of it in its Borax do not fully neutralize the soda, so that Borax is an alkaline salt.

Soluble Cream of Tartar is a solution of three parts of cream of tartar, one part of Borax, and eight parts of water, boiled for two or three minutes, and filtered when cool; when this solution is evaporated it forms a gummy mass, which absorbs moisture from the atmosphere, and is white, sour, and soluble in water. *Boro-tartrate of potassa*, $KO\ 2\ \bar{T}+BO_3$, (another name for soluble cream of tartar), is made by dissolving four parts of cream of tartar and one of crystallized boracic acid, in twenty-four parts of water, evaporating to a syrupy consistence, and spreading it on plates to dry. It is soluble in water in all proportions. When Borax is added to a mucilage it soon thickens it into a firm, tremulous jelly, which is soluble in syrup. A few drops of diluted acetic acid added to the mucilage or emulsion will prevent this action of Borax.

Borax is rarely adulterated. An adulteration has been noticed in England, in which the Borax contained twenty per cent. of phosphate of soda. This may be separated by exposing the article to the heat of a drying-room for a few hours, when the phosphate effloresces, and may be *picked* out and tested with the usual reagents.

Properties and Uses.—The medicinal actions of Borax are but imperfectly known. It is supposed to be a diuretic, refrigerant, antilithic, emmenagogue, and aphrodisiac. It has been found an excellent remedy in renal diseases and gravel, when uric acid is present in excess, and may be used in doses of from twenty to forty grains. It is rarely used as a parturient agent, yet there is no doubt that it exerts an action on the uterus. It has been successfully used in amenorrhea, dysmenorrhea, and to promote parturition, or expedite the delivery of the placenta. In such instances it has been used alone, or combined with other agents as ergot, blue cohosh, cinnamon, etc. Ten grains given for a dose, and repeated three or four times a day for several days, have produced abortion, attended with pains all over the system, and excessive debility of the joints, which remained for several months in a greater or less degree. It is an aphrodisiac, and will excite the venereal appetite when taken internally; but its aphrodisiac effects are said to be more marked when a solution of it is injected into the rectum, and retained there an hour or two. A solution of ten or fifteen grains to the fluidounce of water, injected, will, in two or three hours, produce a powerful venereal excitement. And if the strength of the solution be doubled, it will cause powerful erections, and several copious seminal emissions.

It is in extensive use as an external application in aphthous and inflammatory conditions of the mouth and throat, and in scaly diseases of the skin. A solution of one drachm in five fluidounces of water, with a little sugar or honey, forms one of the best applications for use as a gargle in the early stage of mercurial salivation, and also in all varieties of aphthous ulceration of the mouth and throat. One drachm of Borax dissolved in two fluidounces of distilled vinegar, is said to be an excellent lotion for ringworm of the scalp.—*C.* In liver spots (*pityriasis versicolor*), it has also been found beneficial, and in pruritus vulva, combined with morphia. Combined with sugar it forms an excellent collyrium, and enters into several cooling or refrigerant lotions. The dose of Borax is from ten to thirty grains, dissolved in water, or in infusion of elm or flaxseed.

Off. Prep—Lotio Boracis; Lotio Boracis cum Morphiæ.

SODÆ CARBONAS.

Carbonate of Soda.

History.—Carbonate of Soda exists in a native state in various parts of the world in mineral waters, lakes, and springs, or in the surface of certain soils, in the form of an efflorescence; it is also met with abundantly in the ashes of sea-weeds and salt-marsh plants. It occurs in three forms: 1. The *monocarbonate* or *neutral carbonate of soda*, the *sal soda* of the shops, which is found in crystals, and in the form of efflorescence in Egypt, Hungary, Bohemia, and several other parts of the world. Its formula is $NaO\,CO_2$, with sometimes $+ HO$; its equivalent weight is 53. 2. The *sesquicarbonate of soda*, which occurs in the mineral kingdom, and is found in thin crusts on the surface of the earth, near Tripoli, at the bottom of a lake in Venezuela, on the sides of several lakes in Egypt, etc. Its formula is $2\,NaO\,3\,CO_2$, and its equivalent weight 128. It is probable that this is a double salt composed of the monocarbonate and bicarbonate. 3. The *bicarbonate of soda*, which is a constituent of many mineral waters, but which is generally prepared from the monocarbonate. *See Part II.*

Barilla or *Kelp* are impure preparations of soda, procured from the ashes of marine plants, and were formerly used in the manufacturing of soda. *Barilla* is a hard-grayish or grayish-blue mass, not deliquescent, having an alkaline, acrid taste, and a singular odor. It is obtained by the combustion of plants belonging to the order Chenopodiaceæ, and consists of carbonate of soda, sulphate of soda, sulphuret and chloride of sodium, carbonate of lime, alumina, silica, oxide of iron, and carbonaceous matters. There are several varieties of barilla, imported from the Canary and Teneriffe Islands, Sicily, Carthagena, and the East Indies. *Kelp* is obtained by the combustion of cryptogamic plants of the order Algaceæ. It consists of hard, dark-gray or bluish masses, having an acrid caustic taste, and is composed of chloride of sodium, carbonate of soda, sulphates of soda and potassa, chloride of potassium, iodide of potassium or sodium, and insoluble and coloring matters. At one time about 20,000 persons were engaged in the manufacture of kelp in the Orkneys and Hebrides Islands.—*P.*

The artificial salt is prepared by decomposing the sulphate of soda, which salt is more commonly made by converting common salt (chloride of sodium) into the sulphate by means of sulphuric acid. The sulphate being thoroughly dried is intimately mingled with chalk or limestone powder, and pit-coal in powder, in the proportion of 50 of salt, 25 of coal, and from 55 to 60 of calcareous matter, according to its purity; the mixture is then subjected to a strong heat in a reverberatory furnace, and frequently turned over, till flames cease to be emitted, and a pasty, dark mass is obtained called *Black Soda-ash*, *Ball Alkali*, or *British Barilla.* When properly prepared, this contains soda chiefly in the caustic state, and equivalent to about 55 per cent. of the dry carbonate. When this is lixiviated and evaporated to perfect dryness, the soda becomes partly carbonated, and a white or gray compact substance is produced, which is called *Soda-ash* or *White Soda-ash.* The Carbonate of Soda is obtained by calcining this soda-ash in a reverberatory furnace, with its weight of sawdust or coaldust, the temperature being maintained between 650° and 700°, till blue flames cease to issue; the sulphur is thus burnt all away, and all the soda becomes carbonated. The resulting mass is then lixiviated, concentrated till a pellicle forms on its surface, and then poured into tanks to crystallize. This mode of manufacturing Carbonate of Soda, is now carried on throughout England, but especially at Liverpool and Glasgow, on a prodigious scale of magnitude.—*C.*

Carbonate of Soda crystallizes in rhombic octahedres, or in large oblique rhombic prisms, or forms derived from the latter. These are colorless, transparent, alkaline, and somewhat caustic to the taste, exceedingly efflorescent in the air, soluble in two parts of water at 60°, not dissolved by alcohol, and changes reddened litmus to its original blue. At a moderate heat they lose their water of crystallization; if it be increased, they become converted into a white, opaque, anhydrous carbonate. The anhydrous salt is fused at a full red-heat. Carbonate of Soda may be known from the carbonate of potassa by its crystalline appearance and disposition to efflorescence; from bicarbonate of potassa by its efflorescence; from bicarbonate of soda, by that being never distinctly crystalline. In solution, it may be discriminated from carbonate of potassa by chloride of platinum, an excess of tartaric acid, or perchloric acid, occasioning no precipitate; and from bicarbonate of soda by giving a white precipitate with sulphate of magnesia, and a reddish-brown one with corrosive sublimate. Its *incompatibilities* are, acids, metallic and earthy salts, solutions of lime, bitartrate of potassa, hydrochlorate of ammonia, etc. It is composed of one atom of base, 31.3, one of acid 22.12, and ten of water $90 = 143.42$. ($NaO + CO_2 + 10\,Aq$). The quantity of water will, however, vary in its proportion, owing to the degree of efflorescence of the salt.

The ordinary impurities of Carbonate of Soda are, chloride of sodium and sulphate of soda. They may be distinguished as follows: Supersaturate the salt with nitric acid, so as to change it into nitrate of soda, and then divide the solution into two parts; to the one add a solution of chloride of barium, which will give a white precipitate if a sulphate be present; to the other, add a solution of nitrate of silver, which will also give a white precipitate, soluble in ammonia, if a chloride be present. The presence of hyposulphite of soda is detected by hydrochloric acid, which causes the evolution of sulphurous acid gas, and the precipitation of sulphur. Ordinary salt is very apt to be present in the commercial article.

Properties and Uses.—In large doses Carbonate of Soda will prove very injurious, producing a softening and disorganization of the tissues of the stomach. In smaller ones it acts as an antacid and diuretic. The antidotes to an improper dose are vegetable acids, as vinegar, lemon-juice, sour wine, solution of cream of tartar, citric, or tartaric acids; sweet oil largely administered will also modify its destructive action. As a remedy it has been used in gastric acidity, in urinary affections with uric acid deposits, gastro-cephalalgia or sick headache, pertussis, gôitre, scrofula, etc. It is usually preferred to the potassa salt on account of its more pleasant taste. As with all the alkaline carbonates, if too long employed, it may bring on phosphatic gravel through the alkalinity of the urine; on this account, the bicarbonates dissolved in carbonic acid water and taken, are preferable, as the excess of carbonic acid tends to keep the phosphates in solution. It has been found useful in some cutaneous diseases, used internally and applied locally, in solution, fifteen or twenty grains, or even more of the carbonate, to two fluidounces of water. Or a bath may be prepared of similar proportions. The dose of Carbonate of Soda is from ten to thirty grains in solution.

Off. Prep.—Ferri Carbonas Saccharatum; Ferri Subcarbonas; Liquor Sodæ Chlorinatæ; Magnesiæ Carbonas; Pilulæ Ferri Carbonatis; Sodæ Acetas; Sodæ Bicarbonas; Sodæ Carbonas Exsiccatus; Sodæ et Potassæ Tartras; Sodæ Phosphas; Zinci Carbonas Præcipitatus.

SODÆ HYPOSULPHIS.

Hyposulphite of Soda.

Preparation.—Take of crystallized carbonate of soda thirty-two parts; distilled water, sixty-four parts; sublimed sulphur, ten parts. Dissolve the carbonate in the water, add the sulphur, and pass a stream of sulphurous acid through the solution. When the gas shall be in excess in the liquor, Hyposulphite of Soda is in solution. Then boil for a few minutes, filter, evaporate by a gentle heat to a third of its volume, and set aside in a cool place to crystallize. In this process, carbonic acid is evolved, and the Hyposulphite of Soda formed in solution.—*French Codex.* Walchner gives the following as a ready mode of preparing it: Pure crystallized carbonate of soda is dried as much as possible, and reduced to a fine powder; one pound of it is then mixed with ten ounces of flowers of sulphur, and the mixture heated in a glass or porcelain dish gradually, until the sulphur melts. The mass, which cakes together, is kept at this temperature, and is divided, stirred and mixed, in order that each part may be brought into contact with the atmosphere. The sulphuret of sodium formed passes, under these circumstances, by the absorption of oxygen from the atmosphere, with a slight incandescence, gradually into sulphite of soda. It is dissolved in water, filtered, and the liquid immediately boiled with flowers of sulphur; the filtered, nearly colorless, strongly concentrated liquid affords Hyposulphite of Soda in very pure and beautiful crystals, and in large quantity.—*P.*

History.—Hyposulphite of Soda was first noticed by Chaussier in 1709. It forms large, transparent, oblique, colorless prisms, having a cool taste succeeded by bitterness. They are soluble in water, the solution having an alkaline reaction, but are insoluble in alcohol, which precipitates it from water. Chloride of silver dissolves in it almost as readily as sugar in water; with nitrate of silver it gives a white flocculent precipitate, which ultimately becomes black, owing to its conversion into sulphuret of silver and sulphuric acid. It is permanent in the air. Its solution kept in close vessels, deposits sulphur, and changes into sulphite; in a warm air it becomes sulphate of soda, depositing sulphur. Heated, it fuses, giving off watery vapors and sulphureted hydrogen, then becomes dry, and again liquid, at a red heat, while sulphur sublimes, and on cooling, a dark yellow mass of an hepatic smell and taste remains. Its formula is $Na\ O, S_2\ O_2$, and its equivalent weight 79. On account of its dissolving several compounds of silver, it is much used among daguerreotypists.

If Hyposulphite of Soda is contaminated with *sulphuret of sodium*, the white precipitate caused by nitrate of silver will soon assume a gray or black color; if *carbonate of soda* be an impurity, acetic acid will cause an effervescence in the solution; if *sulphate of soda* be present, chloride of barium causes a white precipitate in the solution when acidified.

Properties and Uses.—Hyposulphite of Soda acts as a resolvent, alterative, and sudorific. It has been used as a substitute for the natural sulphurous waters, in chronic diseases of the skin, secondary syphilis, gout, rheumatism, piles, etc., and in biliary calculi, in which it is said to exert a solvent action. More recently it has been advantageously used in a species of water-brash, in which the fluid ejected is very frothy, and contains a fungus growth or plant called *sarcina ventriculi.* Any acidity of stomach must first be removed, after which give a tablespoonful of a mixture composed of infusion of quassia three fluidounces, Hyposulphite of Soda a drachm or a drachm and a half. It has also been employed successfully in aphthous ulcerations of the mouth, both internally and as a local application. Its dose is from ten to sixty grains in pills or aqueous solution. A syrup is composed of one drachm of the Hyposulphite, two ounces and seven drachms of sugar, and one and a half fluidounces of water; dissolve with a gentle heat and filter. The dose is from one to four tablespoonfuls. A bath is also prepared from it, *Balneum Sodæ Hyposulphitis*, as follows: From one to four ounces of the soda-salt, as may be required, is added to enough water to form a bath. If a small quantity of dilute sulphuric acid, or of vinegar, be added to the bath while the patient is immersed, sulphurous acid and sulphur are set free.

SULPHITE OF SODA.—The monosulphate or neutral salt, $NaO\,SO_2 + 8\,HO$, is prepared by saturating the bisulphite of soda with carbonate of soda. It forms in transparent prismatic crystals. The *bisulphite of soda*, Sodæ Bisulphis, may be obtained by passing a current of sulphurous acid gas through a solution of one part of crystallized carbonate of soda in two parts of water, till the liquid reddens vegetable blues, and then concentrate; the bisulphite forms in four-sided rectangular prisms on cooling. They have a sulphurous acid odor, redden vegetable blues, and have an acid sulphurous taste; their formula according to Mr. Thos. Clark is $NaO\,2\,SO_2\,9\,HO$. One part of them is soluble in four parts of water at 60°, and more freely in boiling water. This salt has been preferred by some physicians to the Hyposulphite, in the vomitings and aphthous ulcerations referred to above; it being remarked that when the Hyposulphite is decomposed by the hydrochloric acid of the stomach, not only is sulphurous acid set free, but sulphur is precipitated which is not a desirable agent, —this is not the case with the bisulphite. The dose of the bisulphite of soda is from twenty to sixty grains. Added to syrups or vegetable juices, a few grains of the bisulphite being put into a bottle containing ether, sulphurous acid is evolved, which by destroying the yeast plant or its seeds prevents fermentation. A solution, injected into one of the common carotid arteries, has been used as a preservative of bodies for dissection; it must be fully saturated with the sulphurous acid gas, or it will promote putrefaction. It not only preserves the bodies, but does not destroy the scalpels, nor cause any inconvenience when applied to cuts or abraded surfaces. It has also been used in epidemic cholera as a disinfectant, being given internally, while the rooms and streets were fumigated with sulphurous acid.

Dr. Astrié highly recommends the sulphite of soda as a remedy to the effects of mercury upon the system; the thick precipitate formed by the union of white of egg and a solution of corrosive sublimate, is at once restored to a transparent fluid by a few drops of a solution of the sulphite of soda. This salt may be commenced in doses of eight grains a day, and gradually increased to a drachm. It is very refreshing, with an after-taste somewhat like roasted hazel-nuts, is soluble in four parts of cold water, and may be given in sweetened water. It agrees well with the stomach, has no local irritating properties, and acts as a diuretic.

SODÆ SULPHAS.

Sulphate of Soda.

History.—Sulphate of Soda, also known as *Glauber's Salt*, from its discoverer in 1658, and *Vitriolated Soda*, exists more or less abundantly in various mineral springs, in sea-water, and in the form of mineral blended with sulphate of lime. It is found in the mineral spring of Carlsbad, Cheltenham, Sulphur Springs of Virginia, Saratoga Pavilion spring, Geyser springs, and Paipa among the Andes, in the latter of which it is so abundant that it forms crystals upon the soil over which the water is thrown. It is also found in the ashes of some marine plants, and in the blood, urine, and other animal fluids. It is likewise prepared artificially from sea-water; by the double decomposition which ensues when the solutions of chloride of sodium and of sulphate of iron are mixed together, etc. The Edinburgh Pharmacopœia gives the following formula for preparing it: "Take of the salt which remains after making pure muriatic acid, two pounds, dissolve this in boiling water, three pints (Imperial measure); then add of powdered white marble, so long as effervescence takes place; boil the liquid, and, when neutral, filter it; wash the insoluble matter with boiling water, adding the water to the original liquid; concentrate till a pellicle begins to form, and then let the liquid cool and crystallize."—*C.*

Sulphate of Soda crystallizes in large oblique rhombic prisms, often truncated on their acute edges so as to form six-sided prisms, and terminated by two, four, or six converging planes; when hastily crystallized, the crystals are small and acicular. Its crystalline form and general appearance resemble those of the sulphates of magnesia and zinc. Its taste, at first has some resemblance to that of common salt, but soon becomes very disagreeably bitter. When exposed to the air it effloresces, loses great part of its water, and falls into a white powder, but is not otherwise altered; it loses about 56 per cent. of its weight. One part of it is soluble in three parts of water at 60°, and in one part of water at 212°. Alcohol does not dissolve it. When exposed to heat, it first undergoes the watery fusion, then its water of crystallization is evaporated, and it is reduced to a white powder. At a red heat this powder fuses again. Sulphate of Soda is not liable to adulteration, though sometimes its acid or base may be present in excess, which may be readily ascertained by test-paper. Should it contain salt, or iron, these may be detected by the usual tests. Sulphate of Soda is *incompatible* with baryta and potassa, and salts containing these bases, and with the salts of silver, mercury, lead and lime. It is composed of one equivalent of base 31.3, one of acid 40.1, and ten of water 90. Its formula is $Na\,O\,SO_3$, and its equivalent weight 71.3; the crystallized salt is $NaO, SO_3+10\,HO=161.3$.

Properties and Uses.—Sulphate of Soda is a mild but efficient cooling laxative or purgative, promoting secretion and exhalation from the gastro-intestinal membrane, without causing inflammation or fever. It appears to impede the coagulation of blood, and also causes endosmose of the serum. On account of its disagreeable taste, it has been gradually displaced by the sulphate of magnesia. Its usual dose is six or eight drachms dissolved in eight or ten fluidounces of water; when its water of crystallization is removed by drying or efflorescence the dose must be decreased to three or four drachms. As a diuretic, the dose must be smaller, and diluted with considerable water. A few drops of sulphuric acid may be advantageously added to lessen its bitter taste; or, some citric acid.

SODII AURO-TERCHLORIDUM.

Auro-Terchloride of Sodium. Chloride of Gold and Soda.

Preparation.—In the Prussian Pharmacopœia, this salt is ordered to be prepared as follows: Dissolve six parts of gold in a sufficient quantity of muriatic acid, adding as much nitric acid as is required to dissolve the gold. Then mix ten parts of dry muriate of soda; and after evaporating the solution over a slow fire· reduce it to a yellow powder. The remaining yellow salt is stronger than that usually prepared, and has the disadvantage of attracting moisture from the atmosphere. The following are better processes:

1. Dissolve four parts of gold in nitro-muriatic acid, evaporate the solution to dryness, and treat the dried mass with eight times its weight of distilled water containing in solution one part of well dried common salt. Evaporate the solution nearly to dryness, stirring all the time with a glass rod.—*Figuier.*

2. Dissolve 85 parts by weight of terchloride of gold, and 16 parts of chloride of sodium, in a small quantity of water; evaporate the solution by a gentle heat until a pellicle forms, and then put aside to crystallize.

History.—This salt, also known as *muriate of gold and soda*, is in the form of prismatic, quadrangular, and elongated crystals, of a very lively-yellow color, permanent in the air, unless they contain uncombined terchloride, when they are slightly deliquescent. They are composed of

69.3 of terchloride of gold, 14.1 of chloride of sodium, and 16.6 of water; their formula is $Na\ Cl\ Au\ Cl_3+4\ HO$, and their equivalent weight 400. They are soluble in water. When heated they give out water, and then melt, and at a red heat give out chlorine; but it requires a very long continued application of heat to drive off the whole of the chlorine. Of all the preparations of gold, this is the most to be relied upon. When taken into the system, being a soluble salt it is excreted and passed off by the skin and kidneys, principally the latter. It is *incompatible* with most vegetable and mineral acids, earths, most vegetable juices, and the oxides or salts of other metals. The simpler the form in which it is prepared for administration, the less liability will there be of its decomposition.

Properties and Uses.—The chloride of gold and Soda, in large doses, is a corrosive poison, in small medicinal doses it is endowed with general stimulant and diuretic properties, acting also as an energetic alterative. It has been highly recommended in primary and secondary syphilis, scrofulous and herpetic affections, gôitre, scirrhous tumors, ophthalmic affections, dropsy, etc. It is principally used among physicians as an antisyphilitic; in which it is of decided efficacy. In four cases where some of the virus from chancres had accidentally lodged in the eye, producing symptoms threatening a loss of that organ, I saved the eyes by bathing them several times a day, with a wash made by dissolving seven grains of the chloride of gold and soda in a fluidounce of distilled water; likewise using the salt internally. The dose internally is from one-twelfth to one-thirtieth of a grain, which may be given in pill form or in solution, thus,—Dissolve two grains of mur. gold and soda in a fluidounce of water, of which the dose is ten or fifteen drops every two or three hours. For pills, mix two grains of the salt of gold, with one drachm of powdered starch, lycopodium, or orris root, and form into a pill mass with a sufficient quantity of gum Arabic in solution; divide into forty pills, each of which contains one-twentieth of a grain of the gold-salt. Or, it may be given in powder made by rubbing together one grain of the salt with one drachm of white sugar, or sugar of milk, and dividing into twelve, fifteen, or twenty powders, according to the dose required. Externally it may be applied to scrofulous and syphilitic ulcers, in solution, or, made into an ointment with prepared lard, in the proportion of seven or nine grains to the ounce of water, or lard.

SODII CHLORIDUM.

Chloride of Sodium.—Common Salt.

History.—Chloride of Sodium (*Sodæ Murias, Muriate of Soda*) occurs abundantly in both kingdoms of nature, being met with in the solid form, and as an ingredient of various waters. It has been known and employed as an indispensable seasoner of food since the very origin of the human race. It exists in unlimited quantity in the waters of the ocean, and is also found in many mineral waters, springs, etc., in a state of solution. It is also met with in the solid form near Cardona, in Spain, near Cracow, and in various other parts of the globe. Marine plants contain it, as well as the blood of man, urine, etc. Sea water contains about two and a half per cent. of chloride of Sodium, in combination with several other salts. All salt waters have the salt procured from them either by concentrating their water with the aid of heat, or by spontaneous evaporation. In France, and along the borders of the Mediterranean, the waters are evaporated by exposure to the sun, and the salt procured is the *bay salt* of commerce, which is in large grains approaching the cuboidal form. In the evaporation of sea water, sulphate of lime is deposited in the early part of the process, and after the crystallization of the Chloride of Sodium, a large proportion of magnesian salts remain in the mother-water. The salt obtained is in small, white, irregular grains, tending to the cubic form, and is called *sea-salt.* Salt found already existing in the solid state, is termed *Rock-salt*, *Fossil-salt*, *Gem-salt*, etc. It is usually tinged with yellow, or some other color, owing to its association with small quantities of iron, etc. All these various forms of salt may be purified by solution and re-crystallization. The difference in them consists in the size and density of their grains, and the impurities with which they are combined; the salt itself does not vary in its constitution.

Chloride of Sodium crystallizes in regular colorless, transparent cubes, by slow evaporation; and in hollow, four-sided pyramids, by rapid. They are permanent in the air, but become moist on the surface in a damp atmosphere, or when chloride of magnesium is present. They are soluble in two parts and two-thirds of temperate water, which solubility is slightly increased in boiling water. They are scarcely soluble in absolute alcohol, and contain no water of crystallization. Heat causes Chloride of Sodium to decrepitate from the presence of water inclosed in the crystals; a red heat fuses, and a white heat volatilizes it. It communicates a bright yellow hue to the flame of spirit. Nitrate of silver added to its solution occasions a curdy white precipitate of muriate of silver, soluble in ammonia. It does not yield a yellow precipitate with chloride of platinum, nor a crystalline deposit with tartaric acid, as is the case with chloride of potassa. Its most usual impurities are sulphates, nitrates, and chlorides of lime and magnesia. Pure chloride of Sodium is almost equally soluble in temperate and in boiling water; has no action on litmus or turmeric; yields little or no precipitate with carbonate of soda, and nitrate of baryta; its solution is not precipitated by solution of carbonate of ammonia followed by solution of phosphate of soda; and a solution of nine grains in distilled water, is not entirely precipitated by a solution of twenty-six grains of nitrate of silver. If lime and magnesia are together in the salt as impurities, carbonate of soda will occasion a white precipitate; nitrate of baryta, will give a white precipitate if a sulphate be present. Carbonate of ammonia causes a precipitate if lime be present, after which phosphate of soda will detect magnesia. It is *incompatible* with nitric, sulphuric, and several other acids, carbonate of potassa, nitrate of silver, and protoxide of mercury. It is composed of one equivalent of chlorine 35.42, and one of Sodium 23.3=58.72, Na+Cl.

Properties and Uses.—From two to four drachms of Chloride of Sodium will purge, and sometimes vomit; and in still greater quantity it will induce free emesis without causing prostration. In smaller doses it is a mild irritant, alterative and vermifuge. It is useful in all chronic diseases characterized by a pale color of the tongue with a white coat or fur A teaspoonful or so of salt, swallowed without being in solution, will frequently check hemorrhage from the lungs; and for this purpose, as well as to act as an astringent in diarrhea and dysentery, it has been combined with lemon juice, or a solution of citric acid. As a tonic or alterative it is very useful in scrofula and all strumous diseases. Used moderately as a condiment it improves the digestive powers, and corrects the disposition to generate worms. It should be freely eaten by strumous children, whose digestive organs it invigorates, and those troubled with worms. It is serviceable as an antidote in poisoning by nitrate of silver. Certain kinds of dyspepsia are benefited by it. It exerts a salutary influence upon the system, even during health, when taken in very small quantity, but an undue amount of it used daily, does, undoubtedly, in many persons dispose to plethora and corpulency. In spasms of an epileptic or apoplectic character, the effects of intemperance, salt and mustard, a teaspoonful or two of each, given in warm water, every ten or fifteen minutes, until free emesis is produced, will be found the most efficient emetic. In these cases, counter-irritation may be produced by bastinadoing the feet, and after the vomiting, the patient may drink freely of good fresh milk. During the cholera of 1849–50–51, in Cincinnati, much benefit was derived from the following mixture: black pepper, in powder, fine table Salt, of each, one teaspoonful; vinegar, five teaspoonfuls; hot water, half a tumblerful. Dose, a tablespoonful every five, ten, or fifteen minutes, as circumstances required. It speedily checked vomiting, abated the watery discharges, and removed the cramps. It succeeded in many cases, where every other means had failed. Externally, it is a topical stimulant, frequently useful in contusions, sprains, and glandular enlargements. In powder or solution it has likewise proved efficacious as an application in some ophthalmic diseases. Added to injections it renders them more stimulating. An artificial sea-water bath, *Balneum Maris Factitium*, is made by dissolving five ounces, avoirdupois, of common Salt to every wine gallon of water; it acts as a mild irritant and tonic, and is very useful for weakly persons and those of strumous diathesis. Another artificial sea-water is made for a *vivarium* or *marine aquarium* in which to keep marine animalcules, sea-plants, diatoms, etc. It is composed of Chloride of Sodium 43¼ ounces, sulphate of magnesia 7½ ounces, chloride of magnesium 6 ounces, sulphate of lime 2¾ ounces, chloride of potassium 1¼ ounce, bromide of magnesium, carbonate of lime, each, 21 grains, soft spring or rain water 10 gallons; mix, dissolve, and filter through a sponge in a glass funnel. The dose of Salt as a tonic and alterative, is from ten to sixty grains. It has recently been recommended as a remedy in phthisis and intermittent fever. The entire absence of salt in the food, gives rise to a cachectic condition, and other morbid states, with the formation of an abundance of intestinal worms.

Off. Prep.—Acidum Muriaticum Purum; Liquor Sodæ Chlorinatæ; Sodæ Murias Purum.

SOLANUM DULCAMARA.

Bittersweet.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT AND TWIGS.

Description.—Bittersweet or *Woody Nightshade*, is a woody vine, having a woody *root*, with a shrubby, flexuous, thornless and branching *stem*, several feet in length; and having an ashy-green *bark* on the stem and large branches. The *leaves* are alternate, acute, generally smooth; the lower ones ovate or cordate; the upper ones more or less perfectly hastate; all entire. The *flowers* are purple, drooping, on branching peduncles from the side of the stem, and arranged in spreading, cymose clusters. *Calyx* very small, purplish, acute, persistent, five-parted. *Corolla* rotate, purple, with five reflexed segments, and two round green spots at the base of each segment. *Filaments* short; *anthers* erect, opening by pores at the apex, yellow, converging into a cone. *Ovary* roundish; *style* filiform; *stigma* simple, obtuse. The *fruit* is a scarlet, oval, juicy, bitter and poisonous berry; *seeds* many, plano-convex, whitish.—*L.*—*W.*—*G.*—*B.*

History.—Bittersweet, also known by the names of *Violet-bloom* and *Scarlet-berry*, is common to both Europe and this country, growing in moist banks, around dwellings, and in low, damp grounds, about hedges and thickets, flowering in June and July. Its berries are ripened in autumn, and hang upon the vines for several months. There are two varieties, the *S. Tomentosum* with a round stem, almost glabrous throughout; and *S. Marinum*, having an angular stem, leaves ovate-cordate, not hastate, pubescent. The parts used in medicine are the roots and twigs. The berries when eaten have certainly produced serious consequences, though considered by many to be harmless.

The twigs should be collected in the autumn, after the dropping of the foliage; they have an unpleasant odor, which is lost by drying; and their taste is bitter, followed by some sweetness and a slight acridity. The dried twigs found in the shops are in pieces varying in length, having a greenish-gray epidermis, a light wood, and a very light and spongy pith. They impart their properties by infusion to boiling water, and also to diluted alcohol; long boiling impairs their medicinal activity. Pfaff found them to contain picroglycion 21.817; vegeto-animal matter 3.125; gummy extractive 12.029; gluten with green wax 1.4; resin containing benzoic acid 2.74; gummy extractive, starch, sulphate and vegetable salts of lime 2.0; oxalate and phosphate of lime with extractive 4.0; and woody-fiber 62.0. Desfosses discovered *solanina* in the stems.

Several other species of Solanum appear to possess medicinal power. An extract of the herb *Solanum Tuberosum* (common potato), has been found useful in chronic rheumatic affections, gastric and intestinal spasms, cough, etc., in the dose of from one-eighth of a grain to a grain. Some practitioners have, however, employed it in these affections, and in very large doses, without observing any influence whatever. Probably, cultivation, soil, climate, season, etc., exert some influence upon the medical powers of the plant. The potato itself has been eaten raw, either with or without vinegar, in cases of scurvy, and with good effect; occasionally it caused narcosis, and slight purgation. Considerable potassa may be procured from potato-stalks; and if they be gathered while the plant is in flower, and passed through an oil-mill, the juice obtained is said to form a handsome yellow dye.

SOLANUM LYCOPERSICON (*Lycopersicon Esculentum*), or Tomato, like the potato, came originally from South America. Its fruit contains an acid, a thick, adhesive, brownish, resinous-like substance, and, probably, an alkaloid. It is much used as an article of food in the United States, and is supposed to exert a healthy influence upon the liver and biliary organs. The leaves have a heavy, disagreeable odor, and contain oil, extractive, and an alkaloid strongly resembling Solanina. Most of the Solanums are nutritive, or possess medicinal virtues.

Solanina may be obtained by expressing the juice of the ripe berries of *Solanum Nigrum*, and then adding ammonia to the liquid. The alkaloid is thrown down in a grayish powder. Dissolve this in boiling alcohol, and digest the solution with a little animal charcoal. Filter and evaporate, and Solanina is obtained pure. It may also be obtained from the stalks, leaves, and berries of *S. Dulcamara*, and *S. Tuberosum*, by forming a hot alcoholic solution, concentrating, and allowing to cool, when the alkaloid forms in crystals. Wackenroder has also obtained it from potato sprouts by allowing them to macerate for twenty-four hours in water rendered acid by the addition of sulphuric acid, repeating the maceration with new portions of sprouts in the same liquid, and expressing. Having allowed the liquid to stand seven or eight days, it was filtered, and a small excess of slaked lime, in powder, added; then filtered to obtain the precipitate, which was dried, and boiled in alcohol. By several solutions in boiling alcohol, and subsequent crystallizations, he obtained crystals of Solania. Solania crystallizes in minute prisms, or feathery crystals, which are colorless or of a pearly luster, odorless, and having a sharply bitter, aromatic taste, followed by persistent itching in the esophagus. It is hardly soluble in water or ether, more so in cold alcohol, and readily so in boiling alcohol. It has an alkaline reaction, and forms with acids bitter salts. Iodine forms with it, or its salts, a brown iodide of Solanina, which is insoluble. Solanina sometimes is obtained in the form of a pearly-white powder. It appears to be poisonous, one grain having killed a rabbit in six hours; four grains caused paralysis of the hind legs in an hour, followed by death in eight hours. Its formula according to Blanchet is $C_{84}\ H_{68}\ NO_{28}$, and its equivalent weight 810.(?) It has not been used in medicine.

Picroglycion (Pfaff), or *Dulcarin* (Desfosses), is a bitter, sweetish crystalline substance, which is fusible, soluble in water, alcohol, or acetic ether, and is not precipitated from its solutions by infusion of nutgalls, or metallic salts. Pelletier thinks it is sugar combined with Solanina.—*P.*

Properties and Uses.—Solanum Dulcamara is a mild narcotic, diuretic, alterative, diaphoretic, and discutient. It has been chiefly used in syrup or decoction in cutaneous diseases, syphilitic diseases, rheumatic and cachectic affections, ill-conditioned ulcers, scrofula, indurations from milk, leucorrhea, jaundice, and obstructed menstruation. It is of more benefit in scaly cutaneous diseases than in others, as in leprosy, tetter, eczema, and porrigo, and especially in combination with guaiacum and yellow-dock root. In large doses it causes sickness at stomach, vomiting, prostration or syncope, and spasmodic twitchings. With some persons it depresses the action of the heart and arteries, and causes a moderate degree of lividity on the hands and face. It is reputed antaphrodisiac, and has proved beneficial in mania attended with powerful excitement of the venereal functions. Equal parts of the twigs, yellow-dock root, and stillingia made into a syrup, form a valuable preparation for scrofulous affections, as well as syphilitic. Externally, in the form of ointment, it is employed as a discutient to painful tumors, also as an application to some forms of cutaneous disease, ulcers, and erysipelatous affections. Dose of the decoction or syrup, one or two fluidounces; of the extract, from two to five grains; of the powdered leaves, from ten to thirty grains.

Off. Prep.—Decoctum Solani; Extractum Dulcamara.

SOLANUM NIGRUM.

Garden Nightshade.

Nat. Ord.—Solanaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES.

Description.—Solanum Nigrum is a fetid, narcotic, bushy herb, with a fibrous *root*, and an erect, branching, angular, herbaceous, thornless *stem*, one or two feet in height. The *leaves* are undivided, ovate, toothed and waved, smooth, lengthened out at the base, and almost always with the lamina perforated and the margin erose as if gnawed by insects. *Umbels* from the intermediate spaces between the leaves, solitary, peduncled, simple, downy, and nodding. *Flowers* white or pale-violet, with a musky scent; *anthers* yellow. *Berries* globose, black, about the size of peas.—*L.*—*W.*—*G.*

History.—The *Garden* or *Deadly Nightshade*, is found growing along old walls, fences, and in gardens, in various parts of the United States, flowering in July and August. There are several varieties of this species, of which the Solanum Virginianum is the most abundant in this country. It has an erect, prickly *stem;* pinnatifid *leaves*, prickly on both sides; *divisions* sinuate, obtuse; *margin* ciliate; *calyx* prickly, and *flowers* blue, or whitish. The leaves are the parts employed, and yield their properties to water, alcohol, or fixed oils.

Properties and Uses.—Solanum Nigrum is a narcotic and sedative, producing, when given in large doses, sickness and vertigo. One to three grains of the leaves infused in water, will, it is said, produce a copious perspiration, and often purge on the next day. They have been used in cancer, scurvy, and scrofulous affections, being applied locally as a cataplasm, or in ointment, and also exhibited in small doses internally. Solania exists in it more abundantly than in the S. Dulcamara, to which it is somewhat analogous in medicinal properties, with more active and energetic narcotic virtues. The berries are poisonous, causing torpor, burning in the stomach, fever, nausea, stupor, and insensibility; though this is denied by M. Dunal of Montpelier. The plant is now employed in the form of ointment only, as a discutient.

Off. Prep.—Unguentum Stramonii Compositum.

SOLIDAGO ODORA.

Sweet-scented Goldenrod.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES.

Description.—This plant is also known as *Fragrant-leaved Goldenrod*, and *Sweet Goldenrod;* it has a perennial, woody, much branched and creeping *root*, and a slender, round, yellowish-green *stem*, smooth or slightly pubescent below, pubescent at top, often reclined, and two or three feet in height. The *leaves* are closely sessile, linear-lanceolate, broad at base, entire, acute, rough at the margin but otherwise smooth, with a prominent midrib, and covered with small pellucid dots. The *flowers*, are of a deep golden-yellow color, and are arranged in a terminal compound, and usually secund-paniculate raceme, the branches of which are very slender, rigid, and spread almost horizontally, are each accompanied by a small leaf, and support the flowers on downy pedicels, which put forth from the upper side of the peduncle, and have small, linear, subulate bracts at their base. *Scales of the involucre* oblong, acute, smooth, or slightly pubescent, the lower ones shorter, and closely imbricating the rest. *Florets of the ray* few, with oblong, obtuse, yellow ligules; those of the *disk* funnel-shaped, with acute segments. *Pappus* shorter than the florets of the disk. (The leaves of this plant are from an inch and a half to three inches long by from three to five lines broad, with a strong, yellowish midvein, but no veinlets.)—*L.*—*G.*—*W.*

History.—This plant is common to the United States, growing in dry fertile woodlands and sunny hills, and flowering from July to October. There are many species of this genus growing throughout the country, and which differ from each other in their degree of astringency and fragrance. The *leaves* are the parts used, they have an odor when bruised resembling anise and sassafras, and a slightly astringent, spicy, rather pleasant taste; they contain a volatile oil, which may be procured by distilling them with water; it is of a pale-yellowish color. When properly dried the leaves form an excellent substitute for tea. They impart their virtues to alcohol, or boiling water in infusion; but boiling injures them.

Properties and Uses.—Sweet-scented Goldenrod is gently stimulant and carminative; and in warm infusion diaphoretic. It may be given in infusion in flatulent colic, sickness at stomach, and as a pleasant drink in convalescence from severe dysentery, diarrhea, cholera-morbus, etc.; and may also be added to nauseating medicines to render them more agreeable to the taste. The oil is carminative and diuretic; and its tincture or essence has been used as a diuretic in suppression of urine among infants, and as a local application in some forms of headache. Its essence is useful to remove flatulency, check vomiting, relieve cramp of the stomach, and to hide the unpleasant flavor of nauseous medicines. The flowers are said to be aperient, tonic, astringent, and diuretic, and have been found beneficial in gravel, urinary obstructions, ulceration of the bladder, and in the early stage of dropsy; taken in infusion.

SOLIDAGO RIGIDA.

Hardleaf Goldenrod.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES AND BLOSSOMS.

Description.—This plant is also termed *Rigid Goldenrod;* it has a simple *stem*, corymbose above, terete, round, striate, rough, minutely hairy, very leafy, and from three to five feet in height. The *leaves* are from one to four inches long, ovate-oblong, rough, with minute, rigid hairs; the upper ones being entire, veiny, thick and rigid; the lower closely sessile, by a broad base, slightly serrate; the radical ones lanceolate, acuminate, nerved, petiolate, sometimes near a foot long, and about two or two and a half inches broad. The *flowers* are all yellow, and arranged in a terminal, compound, close, compact, paniculate raceme. *Heads* very large, about thirty-four flowered; *rays* twice the length of the obtuse involucre, deep-yellow, from seven to ten, and about three lines by one. *Scales of the involucre* round-obtuse, nerved, membranaceous at the edges.—*W.*—*G.*

History.—This is a tall species growing in dry fields and rocky woods throughout the United States, and is abundant in the Western prairies, flowering in August and September. It is the styptic plant of old Dr. Bone, of New Jersey, who is said to have suppressed hemorrhages from large blood-vessels by applying it locally, in the powdered state; a property likewise attributed to the *Solidago Virgaurea* or *European Goldenrod*, found in this country and Europe. The leaves and blossoms of *S. Rigida* are the parts employed; they have an astringent taste, and yield their virtues to water or alcohol.

Properties and Uses.—Hardleaf Goldenrod is tonic, astringent, and styptic. In powder or infusion, it is beneficial in all external hemorrhages, epistaxis, hemoptysis, hematemesis, and hemorrhage from the bowels. Applied with excellent effect in form of poultice, to old ulcers. The oil is diuretic. The plant deserves further investigation.

The *Solidago Gigantea*, Smooth Three-ribbed Goldenrod, will likewise be found to possess similar virtues. The *Chrysopsis Argentea*, Silver Aster, also named *C. Graminifolia*, belonging to this family of plants, form a very powerful styptic application to wounds, and is said to be the sheet-anchor in field surgery among the Cherokees. Internally it is beneficial in diarrhea, dysentery, aphthous ulceration of the mouth, etc.

SPIGELIA MARILANDICA.

Pink-root.

Nat. Ord.—Rubiaceæ; *Suborder*, Spigelieæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—Botanists vary in their arrangement of this plant; beside the above given order and suborder, we find it classed in the natural order *Gentianaceæ*, also *Spigeliaceæ*, and again *Loganiaceæ*. It is usually known as the *Carolina Pink*, or *Worm-grass*. It is a herbaceous, indigenous plant, with a perennial, very fibrous, yellow *root*, which sends up several erect, simple, nearly smooth, four-angled *stems*, of a purplish color, and from six to twenty inches high. The *leaves* are opposite, sessile, ovate-lanceolate, acute or acuminate, entire, and smooth, with the margin and veins roughish-hairy; they are three or four inches long by an inch and a half, or two inches and a half broad, and the stipules are scarcely perceptible. The *flowers* are few in number, are arranged in a terminal secund spike, and supported on short pedicels; they are somewhat club-shaped, scarlet externally, yellow internally, and from an inch and a half to two inches in length. The *calyx* is persistent, with five long, linear, subulate, finely serrulate divisions, which are reflexed in the ripe fruit. The *corolla* is funnel-shaped, four times as long as the calyx, the tube inflated in the middle and angular at top, and divided into five acute, spreading segments, the edges of which are slightly tinged with green.

The *stamens* are short, inserted into the mouth of the corolla between the segments; *anthers* oblong, heart-shaped, exserted. *Ovary* small, superior, ovate; style about the length of the corolla, jointed near its base, and terminating in a linear, fusiform, fringed stigma, projecting considerably beyond the corolla. The *capsule* is double, consisting of two cohering, one-celled, globular carpels attached to a common receptacle, and containing numerous, small, angular seeds.—*L.*—*W.*—*G.*—*B.*

History.—This plant is a native of the United States, growing in dry rich soils, and on the borders of woods in the Southern States, flowering in May and June. The plant, of which several varieties exist, was used by the natives as an anthelmintic long before the discovery of America, and through them a knowledge of it was imparted to the early settlers, who used it for some years before it was introduced to the profession. Drs. Lining, Chalmers, and Garden, of South Carolina, acquainted the medical public with its uses, since which it has become an officinal remedy. It is generally received in bales or casks from the Western States, in which section it has been found growing in great abundance. The part used is the root; it is composed of a number of delicate, crooked, corrugated fibers, of a dark-brown color externally, issuing from a short dark-brown rhizome, and having a feeble odor, and a bitterish, saccharine, somewhat nauseous taste. Boiling water readily takes up its sensible qualities by infusion. Wackenrode found the herb to contain myricin 0.30, resin, with chlorophyll 2.40, peculiar resin 0.50, peculiar tannic acid 17.20, lignin 75.20, malates of potash, and lime, and chloride of potassium 6.30. In the root he found fixed-oil a trace, acrid resin with some fixed-oil 3.13, peculiar tannic acid 10.56, bitter acrid extractive 4.89, lignin 82.69. Feneulle found albumen, and a viscid, saccharine substance. Dr. R. H. Stabler, in a recent analysis of Pink-root, found it to contain a bitter, uncrystallizable, proximate principle, a volatile oil, tannic acid, inert extractive, wax, inert resin, salts of soda, potassa and lime, and lignin. He believes the activity to reside in its bitter, acrid principle, which is soluble in water or alcohol, insoluble in ether, non-volatile, neutral, and deliquescent. The alkaline carbonates do not diminish its activity.—*Am. Jour. Pharm. CXXXI.*, 511. Age impairs the virtues of Pink-root. Sometimes the roots of other plants will be found mixed with those of Spigelia; they, together with the stalks and leaves of the latter, should be carefully removed before preparing the medicine for administration.

Properties and Uses.—Pink-root is an active and certain vermifuge, especially among children. In large doses it is very apt to purge, and produce various unpleasant symptoms, as increased action of the heart and arteries, dizziness, dilation of the pupils, imperfect vision, and muscular spasms, often terminating in convulsions, together with various other indications of narcosis. One of its more frequent effects is spasmodic twitchings of the eyelids. These symptoms seldom happen when catharsis is produced, either by the drug alone, or exhibited in combination with a purgative. The powdered root may be given to a child from two to four years of age in doses of from five grains to a scruple, or one or two fluidounces of a strong infusion, administering it twice a day, for a few days, and then giving an active purgative. A jelly has been recommended as an agreeable form of administration, as follows:—to sixteen fluidounces of water add eight ounces of pulverized Pink-root, and four drachms of Corsican moss, and boil down to ten fluidounces. The decoction should then be decanted into a sauce-pan containing two and a half ounces of white sugar, and again boiled down, carefully stirring with a silver spoon, until four ounces of jelly are obtained. Then strain through a sieve into a jar containing two drops of the essence of citron or caraway. It will keep for sometime in a cool place, and its flavor may be improved by substituting syrup of raspberries, strawberries, gooseberries, or mulberries, etc., for the sugar. It is also useful in those conditions of the system, caused by worms, which resemble infantile remittent and other febrile diseases, and hydrocephalus. A well known worm tea is composed of Pink-root half an ounce; senna two drachms; savin half a drachm; manna two drachms. Mix, and infuse in a pint of water; dose one or two fluidounces. Dose of powdered Pink-root for an adult, one or two drachms.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum; Infusum Spigeliæ.

SPIRÆA TOMENTOSA.

Hardhack.

Nat. Ord.—Rosaceæ. *Sex. Syst.*—Icosandria Pentagynia.

THE HERB.

Description.—This plant, known also by the names of *Meadow-sweet*, *White-leaf*, and *Steeple-bush*, is a small shrub, about three or four feet in height, with several simple, straight, round, ferruginous-tomentose, hard, brittle *stems;* the *leaves* are alternate, simple, ovate-lanceolate, smoothish and dark-green above, rusty white with a dense tomentum beneath, unequally serrate, crowded, and on short petioles—they are an inch and a half to two inches in length, and about one half as wide. The *flowers* are small, very numerous, light-purple or rose colored, and are disposed in a short, dense, slender, terminal spike, or pyramidal cluster of some beauty. The *stamens* are numerous, exserted, conspicuous; *styles* five; *carpels* five, distinct, woolly; *seeds* awl-shaped at each end.—*W.*—*G.*

History.—This is a beautiful shrub, common in low grounds and moist meadows, throughout the United States, flowering from May to August. The herb is the part used, especially the leaves and bark. It has an odor somewhat resembling that of black tea, and a very astringent, bitter taste, which properties it imparts to boiling water in infusion. It appears to contain tannic and gallic acids, and bitter extractive. The fruit is persistent, remaining through the winter, and furnishing food for the snowbird.

Properties and Uses.—Hardhack has been found an excellent astringent in summer-complaint of children, diarrhea, and other diseases requiring this class of remedies, and is less offensive to the stomach than most agents of this kind. It has likewise proved efficient as a tonic in cases of debility, convalescence from diarrhea, dysentery, etc., and to improve the digestive functions. It is generally given in infusion, the dose being one or two fluidounces. A very elegant extract, not inferior to catechu, may be made by carefully evaporating an infusion made by percolation, and which may be given in doses of from two grains to a scruple.

SPIRIT VAPOR-BATH.

Hot-Air Bath.

History and Uses.—A Spirit Vapor-bath exerts a most powerful, yet beneficial influence upon the whole system, aiding very materially our endeavors to remove disease. This highly valuable mode of producing activity of the cutaneous vessels has long been practiced in many sections of the country as a domestic remedial agent, and was first introduced to the notice of the medical profession by myself, about twenty-three years ago, since which it is in much use among physicians. The advantages to be derived from this method of producing perspiration are very great, and it is not followed with any of those injurious consequences which often attend the internal administration of a sudorific.

It is to be given as follows; The patient is undressed, ready for getting into bed, having removed the shirt and underclothing worn through the day, and put on a night-shirt or other clothing to be worn only while sweating, and during the night, if the bath is taken at bedtime. He is then seated on a high windsor, or wooden-bottomed chair, or instead thereof, a bench or board may be placed on a common open bottomed chair, care being taken that the bottom is so covered that the flame will not burn him. After seating himself, a large blanket or coverlid is thrown around him from behind, covering the back part of his head and body, as well as the chair, and another must be passed around him in front, which last is to be pinned at the neck, loosely, so that he can raise it and cover his face, or remove it down from his face, from time to time, as occasion requires, during the operation of the bath. The blankets must reach down to the floor, and cover each other at the sides, so as to retain the vapor, and prevent it from passing off.

This having been done, a saucer or tin vessel, into which is put one or two tablespoonfuls of whisky, brandy, spirits, alcohol, or any liquor that will burn, is then placed upon the floor, directly under the center of the bottom of the chair, raising a part of the blanket from behind to place it there; then light a piece of paper, apply the flame to the liquor, and as soon as it kindles, let down the part of the blanket which has been raised, and allow the liquor to burn till it is consumed, watching it from time to time to see that the blankets are not burned. As soon as consumed, put more liquor into the saucer, about as much as before, and again set it on fire, being very careful to pour no liquor into the saucer while the flame exists, as there would be danger of burning the patient, blankets, and perhaps the house. Continue this until the patient sweats or perspires freely, which in a majority of cases will be in five or ten minutes.

If, during the operation, the patient feels faint or thirsty, cold water must be sprinkled or dashed in his face, or he may drink one or two swallows of it; and in some cases, the head may be bathed with cold water.

As soon as free perspiration is produced, wrap the blankets around him, place him in bed, and cover him up warm, giving him about a pint of either good store tea, ginger, or some herb tea to drink, as warm as he can take it. After two or three hours, remove the covering, piece by piece, at intervals of twenty or twenty-five minutes between each, that he may gradually cease perspiring.

There is no danger of taking cold after this Hot Air bath, if the patient uses ordinary precaution; and if his disease will allow, he can attend to his business on the next day the same as usual. In fact, the whole is a very easy, safe, agreeable and beneficial operation; much more so than a mere reading of the above explanation would lead one to suppose. Chairs are now manufactured expressly for this purpose.

This bath is much employed by many physicians, and is highly beneficial in colds, pleurisy, and all febrile and inflammatory attacks, diarrhea, dysentery, sluggishness of cutaneous vessels, and in all chronic disease where there is an abnormal condition of the skin. In acute diseases, it may be repeated once a day, if required; in chronic diseases, once or twice a week, or once in a fortnight, according to indications.

Where it can be done, it is always preferable to bathe the patient with an alkaline wash, both before and after this Vapor-bath.

SPIRITUS PYROXILICUS.

Pyroxilic Spirit.

History.—This substance has received the names of Wood Naptha, Pyroligneous Ether, Hydrated Oxide of Methyle, Wood Alcohol, Methylic Alcohol, etc.; it appears to have been discovered in 1812 by Mr. Philip Taylor, who, however, did not make it known until in 1822. When wood is distilled for the purpose of obtaining acetic acid, the Pyroxilic Spirit is formed, and found in the aqueous liquid which comes over. It is decanted off to separate it from the tar which comes over at the same time. This aqueous liquid being again subjected to distillation, it is in the first tenth of the product that we are to look for the Pyroxilic Spirit. By repeated rectifications it is obtained in a state of considerable purity. The last rectification must be made over quick-lime, partly to remove water, and partly some other impurities. The quantity of ammonia disengaged when the lime is added is considerable.

Pyroxilic Spirit is pure when it does not become colored by exposure to the air and light, when it mixes with water in all proportions without becoming muddy, and when it has no action on paper stained with vegetable colors. It is colorless, very fluid, and has a peculiar smell, at once alcoholic and aromatic, and mixed with the odor of acetic ether. It boils at 150° F., and its specific gravity is 0.798. It may be preserved without alteration in a vessel, though imperfectly corked; but when its vapor mixed with air is left in contact with spongy platinum, much heat is evolved, and formic acid is formed. It dissolves many salts, many resins, potassa, soda, most essential oils, and forms crystalline compounds with chloride of calcium, baryta, and lime. It readily unites with alcohol, ether, and water.—*T.* It differs from acetone or pyro-acetic spirit by its dissolving a saturated solution of chloride of calcium, which is not the case with the latter.

Properties and Uses.—Pyroxilic Spirit is the preparation recommended by Dr. J. Hastings as a remedy for phthisis pulmonalis; he incorrectly termed it *Wood Naphtha.* Although it has no influence in effecting cures in this disease, it is frequently of service in relieving the cough and feverish symptoms which manifest themselves. As to its action in vomiting, Christison says, "I can amply confirm all that has been said of it as an anti-emetic remedy in cases of chronic vomiting; for in cases of this affection depending on both functional or organic disease, I have frequently seen the vomiting arrested or greatly mitigated by Pyroxilic Spirit." It has also been found of service in dysentery and diarrhea. The dose is from five to twenty drops, three or four times a day, mixed with a fluidrachm or two of compound tincture of cardamom and a fluidounce of water. It may be substituted for alcohol in lamps for chemical purposes,' and answers exceedingly well for making varnishes, as it is more volatile than alcohol. Bodies which contain much oxygen are more readily dissolved by it than hydrogenous bodies.

SHELL-LAC SPLINTS.

Preparation.—Take of finely pulverized Shell-lac *one pound,* Alcohol 90 per cent. *one quart;* mix, and expose it to a moderate heat in a loosely stopped bottle, for forty-eight hours, when the Shell-lac will be dissolved. With this solution saturate woolen cloth, and allow it to dry. To apply and fit the cloth to any part, cut it into the proper shape, and then hold it near a fire or hot stove, or dip it into boiling water, when it will become soft and pliable. As soon as it has cooled so as not to burn the patient, apply it to the part, and by holding it for a few minutes, or by the application of the bandage while it is yet pliable, it will assume any form desired, and on cooling, it becomes hard, and remains exactly as at first placed. If it is desirable to strengthen the splint, take two pieces of the saturated cloth, spread one side of each with a thick coat of the solution, by means of a common paint-brush, allow the alcohol to evaporate, and then, placing these two coated sides together, press them with a hot flat-iron, until they have become perfectly cemented. This operation may be repeated several times, if it is necessary to increase the strength of the cloth, or splint.

SPONGIA.

Sponge.

History.—Sponge belongs to the class Protozoa of animals, characterized by a soft, very elastic body, multiform, more or less irregular, very porous, traversed by numerous canals, which open externally by very distinct vents (oscula), and composed of a kind of subcartilaginous skeleton, anastomosed in every direction; composed of reticulated horny fibers in or among which are usually imbedded siliceous or calcareous spicula; they are fixed by a kind of root at the base, or encrusting. They are in very large masses, flattened and slightly convex above, cracked and lacunose, especially below; oscula large and round. Turkey Sponge from Smyrna is the best and finest kind met with in the shops; West India or Bahama Sponge is of a much coarser character. Sponge adheres to rocks by a very broad base, and those who collect it, carry with them a knife in order to facilitate its removal. When first taken from the sea it has a fishy odor, and has to be squeezed and washed to free it from gelatinous matter, otherwise it would speedily putrefy. Its color varies from a pale to a deep brownish-yellow, and it generally contains sand and other foreign matters from which it should be freed as much as possible, before using. The Sponge of commerce is merely the dry skeleton of the animal from which the gelatinous flesh has been removed. It is soft, light, flexible, and compressible, absorbs water and thereby swells up, burns evolving an animal odor, is dissolved by liquor potassa, and is colored yellow by nitric acid. To prepare it for use, it should first be beaten and well shaken, then placed in water for a day or two, beaten again, dried and shaken to remove foreign substances, after which it may be placed in very dilute hydrochloric or sulphuric acid to dissolve the earthy concretions, and finally washed in several waters to free it from acid. Hornemann found Sponge to contain a substance similar to osmazome, animal mucus, fat oil, a substance soluble in water, a substance soluble only in potassa, and traces of chloride of sodium, iodine, sulphur, phosphate of lime (?), silica, alumina, and magnesia. Hatchett found in it gelatin, and a thin, brittle, membranous substance, resembling coagulated albumen.—*P.*

Properties and Uses.—Sponge, properly prepared, is of much utility to the surgeon, on account of the facility with which it absorbs fluids, and is much used for removing blood during operations, which would otherwise interfere with the safe and rapid termination; to imbibe acrid discharges from wounds and ulcers; and to check external hemorrhage from small bloodvessels by pressing it upon the bleeding part. The Sponge tent made by impregnating Sponge with melted wax, pressing it between two iron plates, and then forming it into the size and shape required, is not resorted to as frequently as formerly in enlarging sinus orifices and canals. Sponge has likewise been used for producing premature delivery; by introducing a piece of Sponge tent, of a conical form, into the mouth of the uterus, and allowing it to remain there for a time, and then changing it, until by its swelling, and the irritation it produces, uterine contractions are caused.

SPONGIA USTA.

Burnt Sponge.

Preparation.—Cut the Sponge in pieces, and bruise it, so as to free it from foreign matters adhering to it; burn it in a covered iron vessel, until it becomes black and friable; afterward reduce it to a very fine powder. *Dunc.*—*Lond.* By burning, Sponge is partially decomposed. It loses its water, and the animal principles of which it chiefly consists are decomposed; but the charcoal and saline matters, especially the iodine upon which its virtues depend, remain in a state fitter for medical use. The burning or roasting should not be carried further than what is sufficient to decompose the animal principles, and render the Sponge friable; 1000 parts of Sponge yield 333 of burnt.—*Ed. Dunc.*

History.—Preuss calcined 1000 parts of Sponge: of these, 343.848 parts were destroyed by heat. The residue consisted of carbon and siliceous insoluble matters, 327.0; chloride of sodium 112.08; sulphate of lime 16.430; iodide of sodium 21.422; bromide of magnesium 7.570; carbonate of lime 103.2; magnesia 4.73; protoxide of iron 28.720; and phosphate of lime 35.0. Burnt Sponge, if good, should evolve violet fumes (*vapor of iodine*), when heated with sulphuric acid in a flask.—*P.*

Properties and Uses.—Said to be alterative and antiscrofulous; and has been efficacious in scrofula, bronchocele, diseases of the skin, and tuberculous affections generally. Its dose is from half a drachm to two or even three drachms. A pill, which has acquired some considerable reputation in the cure of scrofula, is made as follows: Take of iodine fifty grains; sulphate of morphia ten grains; Burnt Sponge one hundred grains. Triturate these well together, and into a fine powder, and then form the mixture into a pill mass, by the addition of molasses or other compatible medium, and divide into one hundred pills. To be kept in a dry place. Dose, two or three pills daily.

STATICE CAROLINIANA.

Marsh Rosemary.

Nat. Ord.—Plumbaginaceæ. *Sex. Syst.*—Pentandria Pentagynia.

THE ROOT.

Description.—The resemblance which this plant bears to the foreign *Statice Limonium*, is such as to have induced many botanists to rank it as a variety. They will be found to differ, however, in the American species having smaller flowers, and flat, somewhat wedge-shaped leaves, while the leaves of the *S. Limonium* are oblong and wavy at the margins. Statice Caroliniana is also known by the names of *Sea-Lavender*, *Ink-root*, etc.; it is a perennial maritime plant, indigenous, having a large, fleshy, fusiform or branched, brownish-red root, from which arises annually a scape and leaves. The *leaves* are all radical petiolate, cuneiform, or narrow obovate, smooth, veinless, obtuse, mucronated, and level and flat on the margin. The *scapes* are round, smooth, slightly scaly, flexuose, terminated by a panicle of numerous branches, which bear the flowers on the upper side only. The *flowers* are pale bluish-purple, alternate, erect, mostly in pairs, but appearing singly in consequence of one expanding before the other. *Peduncles* short, forked, concealed by several sheathing scales. *Calyx* funnel-shaped, scarious and pink at the edge, five-angled, the angles ciliate, and ending in long acute teeth, with sometimes, not always, minute intermediate teeth. *Petals* five, spathulate, obtuse, longer than the calyx. *Stamens* five, inserted in the claws of the petals; *anthers* heart-shaped. *Ovary* superior, small, obovate, with five ascending styles shorter than the stamens. *Fruit* an oblong, utricle, one-seeded, inclosed in the calyx.—*L.*

History.—Marsh Rosemary is common in the salt-marshes on the Atlantic shore of the United States, bearing flowers from August to October. The part used is the root, which is rather large and heavy, inodorous, but having a saltish, amarous, and strongly astringent taste. Alcohol or water takes up its properties, especially when hot or boiling. Mr. E. Parrish, who analyzed it, found it to consist of about 12 per cent. of tannic acid, volatile oil, resin, gum, albumen, caoutchouc, extractive, coloring matter, woody fiber, and several salts.—*Am. Jour. Pharm. XIV.*, 116.

Properties and Uses.—Marsh Rosemary is a strong astringent, and has long been used as a domestic remedy in diarrhea, dysentery, etc., in the form of infusion or decoction. It is not indicated in the acute stages of these affections, but will be found very efficacious as an astringent and tonic, after the active symptoms have subsided. The decoction is very useful as a gargle or wash in ulcerations of the mouth and throat, scarlatina anginosa, etc. Externally, the powdered root may be applied to old ulcers, or made into an ointment, as a soothing application for piles. The decoction is likewise very useful as an injection in chronic gonorrhea gleet, leucorrhea, prolapsus ani and uteri, and in some ophthalmic affections. It may be used in all cases where astringents are indicated.

The *Statice Limonium*, of Europe, is possessed of the same powers, but in a less degree. The infusion may be given in doses of from half a fluidounce to two fluidounces, every two, three, or four hours.

STELLARIA MEDIA.

Chickweed.

Nat. Ord.—Caryophyllaceæ. *Sex. Syst.*—Decandria Trigynia.

THE PLANT.

Description.—This plant is the *Alsine Media* of Linnæus; it is an annual or biennial weed, from six to fifteen inches in length, with prostrate, branched, brittle, round, jointed, and leafy *stems*, distinguished by the alternate, lateral, hairy lines, extending from joint to joint. The *leaves* are ovate, ovate-cordate, and glabrous, the lower on hairy petioles. The *flowers* are small and white, in forked cymes; *petals* two-parted, shorter than the calyx. *Stamens* varying, three, five, or ten.—*W.*—*G.*

History.—This is a common plant throughout the United States, growing in fields and around dwellings, in moist, shady places, probably introduced from Europe; it flowers from the beginning of spring to the end of autumn. The seeds are eaten by poultry and birds. The whole herb is used, when recent.

Properties and Uses.—Chickweed appears to be a cooling demulcent. I have seen the fresh leaves bruised and applied as a poultice to indolent, intractable ulcers on the leg, of many years standing, with the most decided and immediately beneficial results; to be changed two or three times a day. In acute ophthalmia, the bruised leaves will likewise be found a valuable application. An ointment made by bruising the recent leaves in fresh lard, may be used as a cooling application to erysipelatous and other forms of ulceration, as well as in many forms of cutaneous disease.

STILLINGIA SYLVATICA.

Queen's-root.

Nat. Ord.—Euphorbiaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE ROOT.

Description.—This plant is also known by the name of *Queen's Delight*, *Yaw-root*, and *Silver-leaf;* and was named in honor of Dr. Benj. Stillingfleet. It is a perennial herb, with a glabrous somewhat angled *stem*, which, upon being broken, gives out a milky sap, and which attains the height of from two to four feet. The *leaves* are sessile, lance-oblong, tapering at the base, serrulate, somewhat leathery. The *flowers* are yellow, and arranged on a terminal spike; *male flowers* with a hemispherical involucre, many-flowered or wanting, perianth tubular, erose, florets scarcely longer than the bracteal scales; *stamens* two or three, exsert. *Female flowers* with an inferior, one-flowered calyx; *style* three-cleft; *capsule* three-grained.—*Eaton*.— *Wi.*

History.—This plant is found growing in sandy soils from Maryland to the Gulf of Mexico, and in Mississippi and Louisiana, flowering from April to July. A whitish acrid juice exudes from the plant when cut or broken. It is much more active in its recent state, than when dried, and loses much of its medicinal virtue by age. The root is the part used; as found in the shops it is in pieces from one to three or four inches long, and from four lines to an inch or more in diameter, covered with a bark of a yellowish-brown or grayish-brown color externally, and reddish-yellow, or light-rose colored internally, and in its substance, and varying in thickness from a mere scale to a line or two. Its odor is peculiar, slightly oleaginous, somewhat between that of liquorice and blue-flag roots; its taste is somewhat bitter and unpleasant, succeeded by a persistent pungent acridity in the mouth and throat. Its fracture is short, irregular, and exhibits a soft, pithy, yellowish, or pinkish internal woody portion. Alcohol or water extracts its virtues, but its best solvent is diluted alcohol. Its properties appear to be owing to a very acrid oil. It also contains resin, woody fiber, coloring matter, extractive, etc.

The *Oil of Stillingia*, so called by its manufacturers, is more properly an alcoholic fluid extract; it is composed of about forty per cent. of oil, with the remainder consisting of extractive, resin, etc. It is prepared by adding alcohol ninety-five per cent. to the recent root of Stillingia, and making a saturated tincture; then distill off the alcohol. The residue is the preparation sold and used as the oil of Stillingia. Upon standing for a length of time, a flocculent deposit takes place, of a reddish-brown character. A similar preparation is made with ether by displacement and evaporation; it forms a more consistent liquid, probably holding more fixed oil. The above oil or alcoholic fluid-extract of Stillingia, is of a dark brownish-red color, of a strong, peculiar, not unpleasant odor, and of a faint taste at first, but in a short time followed by exceeding pungency and acridity, very persistent in its character, and which is especially felt in the throat and fauces, being accompanied with a very unpleasant sensation in the stomach, if swallowed. The recent root affords a larger quantity of oil, than when old, probably, because the oil becomes oxidized and changed to resin by age, and is no longer soluble in ether, although the real active principle of the article is but little impaired. I have seen a preparation, called Stillingin, purporting to have been prepared by a so-called Pharmaceutical Institute of the city of New York, sold for one dollar per ounce. It was, undoubtedly, the above oil, triturated with sugar or sugar of milk, and the whole cost of which would not exceed twenty cents.

Properties and Uses.—In large doses, Stillingia vomits and purges, producing in many instances, a peculiar, disagreeable burning sensation in the stomach, or some portion of the alimentary canal, accompanied with more or less prostration of the system. In less doses it is an alterative, exerting an influence over the secretory functions, which is unsurpassed by any other known alteratives. It is an American remedy of much importance and value, and is extensively used in all the various forms of primary and secondary syphilitic affections, in which it appears to have almost a specific action, also in scrofulous, hepatic, and cutaneous affections, in which its administration is followed by the most successful results. In the form of fluid extract, combined with oils of anise or caraway it has been found very beneficial in chronic laryngeal and bronchial affections, and in leucorrhea. Small pieces of the recent root, chewed occasionally through the day, have effectually and permanently cured laryngitis and bronchitis. The *oil* is entirely too acrid for internal use, unless it be well incorporated with some mucilaginous or saccharine substance; and, for internal use, the fluid extract, or syrup, will be found sufficiently energetic and efficacious. But as an external stimulating application, the oil will be found very valuable in many instances. One drop of it placed upon the tongue, and repeated three or four times a day, is reputed to have proved successful in cases of severe croup. The dried root is inert or nearly so, hence its powder is of no utility. Dose of the tincture, from half a fluidrachm to a fluidrachm; of the decoction, one or two fluidounces. This article is reputed to have formed an ingredient of Swaim's Panacea; such is not the case.

Off. Prep.—Extractum Stillingiæ Hydro-alcoholicum; Extractum Stillingiæ Fluidum; Linimentum Stillingiæ Compositum; Pilulæ Phyto-laccæ Compositæ; Syrupus Stillingiæ; Syrupus Stillingiæ Compositus Tinctura Stillingiæ.

STRYCHNOS NUX VOMICA.

Nux Vomica.

Nat. Ord.—Apocynaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE SEEDS.

Description.—This is a moderate-sized tree, with a short, pretty thick, often-crooked trunk. The *branches* are irregular, and covered with smooth, ash-colored bark; young shoots are deep green and highly polished. The *wood* is white, hard, close-grained and bitter. The *leaves* are opposite, short-stalked, oval, shining, smooth on both sides, from three to five nerved, or rather between that and triple, or quintuple, differing in size from an inch and a half to four inches long, and from one to three broad. The *flowers* are small, greenish-white, funnel-shaped, and are collected into small, terminal cymes, with a disagreeable odor. The *calyx* is five-toothed; the *corolla* is also five-parted. *Filaments* scarcely any or exceedingly short, inserted over the bottom of the divisions of the corolla; *anthers* oblong, half within the tube, and half without. The *ovary* is superior, roundish, two-celled, with many ovules in each cell, attached to the thickened center of the partition. *Style* as long as the tube of the corolla; *stigma* capitate. The *fruit* is a berry, round, about the size of a large apple, and covered with a smooth, hard rind, of a rich orange-color when ripe, and filled with a white, soft, gelatinous pulp. *Seeds* five, nidulant, discoidal, with a central prominence, covered with a fine woolly substance, but whitish and hard like horn internally.—*L.*

History.—The Nux Vomica tree inhabits Coromandel, Ceylon, and other parts of the East Indies. The wood is exceedingly bitter, especially that of the root, which is said to cure intermittent fevers, and the bites of venomous snakes. The pulp of the fruit is greedily eaten by various birds. The *Lignum Colubrinum* or *Snake-wood*, which is generally referred to the *Strychnos Colubrina*, is frequently nothing else than the Nux Vomica wood. The bark contains a large proportion of brucia, and some strychnia, and is said to be identical with the False Angustura bark.

The seeds are the parts used in medicine. They are round, peltate, scarcely an inch in diameter, nearly flat, or very slightly convex on the dorsal surface, and concave on the other or ventral surface, and are usually surrounded by a filiform annular stria. In the center of the ventral surface of the seed is the orbicular hilum or umbilicus. At one part of their circumference or margin there is a slight prominence, which answers to the chalaza, and to the radicle of the embryo. From this prominence to the umbilicus is a more or less obvious line forming the raphe. These seeds have two coats; the outer one or *testa* is simple, fibrous, and gives origin to short, silky hairs of an ash-gray or yellowish color, and which are directed from the center toward the circumference: within this is the inner coat or *endopleura*, which is simple and very thin, and envelops the nucleus of the seed. This nucleus is composed of two parts—namely, albumen and embryo. The albumen is bipartite, cartilaginous or horny, of a dirty-white color, of an intensely bitter taste, and has, in its interior, a cavity (*loculamentum verum*). Unlike that of most seeds, the albumen of Nux Vomica is of a poisonous character. The *embryo*, which is milk-white, is seated in the circumference of the seed, its locality being frequently indicated by a point somewhat more projecting than the surrounding parts. It consists of two large cordiform, acuminated, triple-ribbed, very thin cotyledons, a distinct cauliculus, and a centripetal radicle."—*P.* Water, proof-spirit, and rectified alcohol dissolve the bitter active ingredients; and the last solvent acts most energetically. Ether takes up a concrete oil, and some wax. The seeds are with difficulty reduced to a powder. The simplest method is that of the Edinburgh Pharmacopœia, which directs them to be softened well with steam, and then sliced, dried and ground. The powder has a fallow-gray color, a bitter taste, and a peculiar odor, similar to that of liquorice. Concentrated sulphuric acid blackens it; nitric acid renders it a deep orange-yellow color. The aqueous decoction is of a pale grayish-yellow color, and intensely bitter, and becomes orange-yellow on the addition of nitric acid, and emerald-green by sesquioxide of iron, which disappears on the addition of hydrochloric acid. Tannic acid, or infusion of nut-galls, produces in the aqueous decoction a copious precipitate. Pelletier and Caventou found the seeds to contain strychnic or igasuric acid, strychnia, brucia, a small quantity of wax, concrete oil, yellow coloring matter, gum, a little starch, bassorin, woody fiber, carbonate of lime and chloride of potassium in the ashes. M. Desnoix has discovered a substance in the seeds which he calls *Igasurin*, and which is found in the mother-waters from which the strychnia and brucia have been precipitated by lime, at the temperature of ebullition. It appears in the mother-liquor as brilliant, silky needles, containing ten per cent. of water, and very bitter. It dissolves readily in 200 parts of boiling water, and crystallizes out quickly when the water cools. Its influence upon polarized light, and its behavior with the usual reagents, are almost identical with those of brucia. Concentrated nitric acid reddens it, and this becomes violet on adding chloride of tin in drops. Sulphuric acid causes first a rose-color, then yellow and greenish-yellow; dilute acids form with it crystallizable salts, mostly soluble; potassa, soda, and ammonia, precipitate it from its solutions, but redissolve it when in excess; iodide of potassium causes a gradual deposit of light reddish-yellow crystals. Its solutions are also precipitated yellow by bichloride of platinum, and white by tannic acid and nut-galls. In some respects it resembles strychnia, in others brucia; but M. Desnoix thinks it to be intermediate between the two.—*Am. Jour. Pharm.*, *XXVI.*, 31.

Vielgruth has proposed the following simple test for Nux Vomica. A few grains of the substance supposed to contain Nux Vomica is treated with proof-spirit. The tincture is evaporated to dryness, at a temperature not exceeding 95° F. A drop or two of dilute sulphuric acid is added to the residue. The whole is again exposed to the above-mentioned temperature; when, if Nux Vomica be present, a beautiful carmine-red color ensues. If the heat be stopped in ten or fifteen minutes, the color disappears, but will appear with less brightness on reheating. (*See Strychnia in Pharmacy.*)

Properties and Uses.—Nux Vomica is an energetic poison, exerting its influence chiefly upon the cerebro-spinal system; it is supposed to affect the spinal cord principally, because the division of this cord does not prevent its poisonous influence, and, again, because when the cord is destroyed by the introduction of a piece of whalebone into the spinal canal, the convulsions immediately cease. In poisonous doses Nux Vomica produces violent tetanic convulsions without impairing the functions of the brain, with asphyxia and death. When given in doses sufficiently large to influence the system, a sensation of debility and heaviness is experienced, the spirits become depressed, the limbs tremble, and a slight rigidity or stiffness comes on when it is attempted to move. Frequently, the person can not stand erect; he staggers, and if at this time he be suddenly tapped on the ham while standing, a slight convulsive attack will often ensue, with an inability to stand. In the most severe paroxysms caused by this medicine, the patient retains his mental faculties, and the slightest motion, noise, or even a breath of wind passing over him, will excite convulsions anew, every time these occur. Sometimes, even with small doses, there will be sudden starts resembling shocks of electricity, which will be more or less severe, occasioning him to jerk the muscles acted upon in this manner. It frequently occasions priapism. Of course, these symptoms vary with different persons, in proportion to their susceptibility to the influence of the medicine, and to the quantity swallowed. The usual effects of Nux Vomica are about as follows: in poisonous doses, stiffness, weariness, pain or rending in the limbs, violent tetanic convulsions, with short intervals of repose, acute sensibility, dreadful alarm, and finally death; in small doses, twitching of the muscles, restlessness, anxiety, and increase of urine, perspiration, etc.; when the doses are rather large, there will be more active spasm of the muscles, a tendency to lock-jaw, with the preceding symptoms more or less severe. Heat in the epigastric region, constriction of the throat, headache, dizziness, and impairment of visio with closely contracted pupils, are often caused by small doses; and more especially with the corpulent and apoplectic, there will be painful sensations in the skin compared to an electric shock, or to the creeping of insects over the surface, with more or less perspiration, slight involuntary spasms of the muscles, and a very disagreeable, dreamy or vague condition of the brain. The pulse may or may not be increased in frequency. Chloroform is said to be beneficial in poisoning by Nux Vomica.

In medicinal doses, Nux Vomica is tonic, and increases the action of the various excretory organs; it should always be given, as well as its alkaloids, in doses to fall short of any immediate sensible effects upon the system. It is principally employed in cases where there is a want of nervous energy, as in the treatment of paralysis, especially when this has been of some standing, and not occasioned by hemorrhage of the nervous centers, or inflammatory conditions of them. It must not be used in recent cases, or while general reaction prevails, or when signs exist either of local irritation in the brain or spinal cord, or of determination of blood toward the head. Congestion or inflammation must always be removed before employing it. It is said to be more beneficial in general palsy and paraplegia than in hemiplegia, and also in local palsies, as of the bladder, amaurosis, impotence, spermatorrhea, tremor of the muscles produced by habitual intoxication, etc. It has also been beneficially employed in neuralgia, chorea, obstinate constipation, prolapsus of the rectum, borborygmi of females, colica pictonum, etc. A small quantity added to cathartics, increases their energy. Dysmenorrhea, dyspepsia, dysentery, rheumatism, hysteria, mania, worms, intermittent fever, eneuresis, chronic splenitis, etc., have been successfully treated by the use of this agent. Nux Vomica and its alkaloids should always be given with great care, the physician closely observing its effects. The dose of powdered Nux Vomica is five grains three or four times a day, and gradually increased to ten, or until a slight influence is observed. The alcoholic extract is the best form of administration and may be given in doses of from one-fifteenth to one-twentieth of a grain as a tonic; and in paralytic affections from half grain to two grains in the form of pill, and, as with the powder, gradually increased. The saturated tincture may be given in doses of from five to thirty drops, likewise gradually increased. (*See Strychnia.*)

Off. Prep.—Extractum Nucis Vomicæ; Pilulæ Copaibæ Compositæ; Strychnia; Tinctura Nucis Vomicæ.

STYRAX OFFICINALE.

Storax.

Nat. Ord.—Styraceæ. *Sex. Syst.*—Decandria Monogynia.

THE CONCRETE BALSAMIC EXUDATION.

Description.—This is a small tree, growing from twelve to twenty feet or more in height, with the branches alternate and round, having its bark smooth, and the young shoots downy. The *leaves* are alternate, ovate or elliptical, entire, usually rounded at the apex, green and smooth above, whitish and tomentose beneath, with short downy stalks. The *flowers* are white, and are disposed in terminal, downy racemes, with angular pedicels. The *calyx* is hoary, almost hemispherical, rather angular at the base, with five or seven very short marginal teeth; *corolla* white, externally downy, somewhat funnel-shaped, and divided into five deeply cleft segments. *Stamens* ten, exserted; *filaments* awl-shaped, united to the tube of the corolla, adhering at the base into a ring; *anthers* linear, yellow, two-celled, opening by internal longitudinal slits. *Ovary* ovate; *style* simple; *stigma* obtuse. *Fruit* a globose drupe, with one or two angular stones, and somewhat concavo-convex.—*L.*— *Wo.*

History.—Storax inhabits the Levant, Palestine, Syria, and is common all over Greece; it is much cultivated in the southern parts of Europe, but is said to produce no balsam, on which account many botanists have doubted whether it is the tree from which the officinal Storax is obtained. Dan'l Hanbury concludes that the original Storax was obtained from S. officinale, that it has now wholly disappeared from commerce, and that the Liquid Storax of the shops is collected in the south-west of Asia Minor, from the *Liquid-ambar Orientale.* For an interesting communication on this subject, see *Am. Jour. Pharm.*, *XXIX.*, 249. There are several kinds of Storax in commerce; the best is *Storax in the tear*, which is in pale yellow or reddish tears, nearly as large as currants. *White Storax* is formed of agglutinated tears, and is in masses resembling pale galbanum. *Amygdaloid Storax* occurs in compact masses, with a fragrant vanilla-like odor, and a yellowish, or reddish-brown color, interspersed with white tears, giving an amygdaloid appearance to the mass. These varieties are very scarce, and are rarely, if at all, met with in the shops of this country.

Common Storax is imported in large round cakes, of a brown or reddish-brown color, and fragrant odor. It is brittle, soft, unctuous, yet easily rubbed into a coarse powder. Exposed to the air it becomes covered with a whitish efflorescence of cinnamic acid. It appears to be composed of liquid resin mixed with bran or fine sawdust, for the purpose, probably, of giving solidity to the drug. The cakes or masses may be easily crushed to a coarse powder, in which state it is usually sold in the shops. In consequence of its impurities, it should be purified by solution in alcohol, strained and then the alcohol distilled off by moderate heat, until the Storax acquires the proper consistence. The Storax of commerce consists of a trace of volatile oil, a little gum, some extractive matter, much woody fiber, with from 33 to 54 per cent. of resin, and from 1 to 2.6 per cent. of benzoic acid.[1]

Liquid Storax is another variety, and which is the most commonly employed. There are two kinds of it: one, imported in casks or barrels from Trieste, is opaque, of a gray color, having the consistence of bird-lime, and the odor of Storax, but frequently intermixed with a feeble odor of benzole. It appears to contain many impurities, and is made into *strained Storax* by heating it until the water with which it is usually mixed is evaporated, and then straining it. The other is a *pellucid liquid Storax*, somewhat of the consistence of Venice turpentine, has a brownish-yellow color, a sweetish, vanilla-like odor, entirely unlike that of sweet gum, and by keeping it yields a white and acid sublimate on the sides of the bottle which contains it. It is an excellent article, and is imported in jars holding fourteen pounds each.

Storax has a peculiar, vanilla-like odor, and a pleasant, benzoinic taste. Alcohol or ether takes up its active properties, and water acquires its odor with a cream-like color. A moderate heat fuses it, and a higher temperature inflames it. *Liquid Storax* has been found by Simon to consist of a volatile oil, called styrole, $C_{16} H_8$, cinnamic acid, styracine, a soft resin, and a hard resin.—*P.*

Properties and Uses.—Storax is a stimulant, acting more especially upon mucous tissues, as do nearly all balsams. It has been found beneficial as an expectorant in cough, chronic catarrh, asthma, bronchitis, and other pulmonary affections; also in gonorrhea, fluor-albus, and gleet, in which it is as efficient, and more pleasant than copaiba. Combined with tallow or lard, it forms a valuable application in many forms of cutaneous disease, especially those common to children, as ringworm, tinea, ringworm of the scalp, etc. It is much used, on account of its fragrance, for compounding ointments and pills, and is an excellent addition to opium in the form of pill, when it is necessary to conceal the taste and smell of this narcotic; three or four grains of Storax may be combined with one grain of opium for this purpose. The dose of Storax is from ten to twenty grains, gradually increased.

A preparation known as *Mackenzie's Syrup*, and which has obtained considerable celebrity in some sections of the country, as a remedy in consumption, coughs, laryngitis, etc., is made as follows: Take of colombo root, and horehound, each, two ounces; boneset one ounce; pleurisy-root four ounces; water two gallons. Boil until one-half of the water has evaporated; subject the articles to another boiling in fresh water, add the two decoctions together, strain and evaporate to six quarts. To this add sugar five pounds; Canada balsam one pound, liquid Storax half a pound; wheat bran two pints; subject to a gentle heat for two hours, add beeswax one pound, and let it stand for twenty-four hours to cool; strain, add one pint of yeast, let the mixture stand for six days, and put into well corked bottles. The dose is one or two tablespoonfuls, three times a day. The sugar and the balsams are undoubtedly the active agents of this heterogeneous compound.

SUCCINUM.

Amber.

History.—The origin of Amber is very uncertain; it is believed to be a fossil resin, the produce of an extinct plant. It may be derived from some resin formerly liquid or soft; or possibly from the slow oxidation of a fatty matter, as we see succinic acid formed from fats by oxidation. It is found in beds of wood coal, deposited in Greenland, France, Switzerland, etc. At Trahenieres, in the Henegau, it is found in clay mixed with a certain quantity of the debris of wood nearly in the state of wood coal. The greatest part of the Amber of commerce is found in Prussia, on the south shore of the Baltic, being thrown up from the sea between Konigsberg and Memel. It is supposed to be derived from beds of wood coal in the basin of the Baltic. It is also met with on the east coast of England, and in several parts of the United States. That it was at one time liquid, is obvious from the insects which are occasionally found buried in it. No living insect is known exactly similar to those found in Amber; showing that a very long period must have elapsed since the trees producing it vegetated.—*T.*

Amber is a brittle, light, hard substance, usually nearly transparent; sometimes almost colorless, but commonly yellow, deep-brown, or red. It usually occurs in irregularly shaped pieces, flat, somewhat rounded at the sides, with considerable luster, tasteless, and without smell, except when pounded or heated, when it emits a fragrant odor. It yields readily to the knife, has a conchoidal vitreous or resinous fracture, becomes negatively electrical by rubbing, and has a specific gravity 1.065. Water has no action on it; but alcohol, by long digestion, dissolves about one-eighth of the Amber, and forms a colored solution, which when concentrated becomes milky when mixed with water; the precipitate possesses the properties of a resin. A boiling fixed alkali almost wholly dissolves Amber, forming a kind of soap, soluble in alcohol or water, and not thrown down by water. Dilute acids have no action on Amber; sulphuric acid converts it into a black resinous mass; nitric acid acts upon it, dissolving it completely. Heated in the air, Amber fuses at about 550°, evolving an agreeable aromatic odor, and burning with a clear yellow flame. It can not be fused without undergoing some chemical change. By destructive distillation in an alembic, Amber yields first an acid liquor, which contains succinic and acetic acids; then some succinic acid is deposited in the neck of the alembic, and an empyreumatic oil, oil of Amber comes over, at first thin and yellowish, afterward brown and thick; toward the end of the operation, a yellowish light sublimate is observed in the neck of the alembic; this is called by Berzelius, *crystallized pyretine;* by Vogel, *volatile resin of Amber;* by Gmelin, *Amber-camphor.* An inflammable gas is evolved during the whole time of the operation, which must be permitted to escape.—*P.* The ultimate constituents of Amber are carbon, hydrogen, and oxygen. The proximate principles are a volatile oil, with a strong but agreeable odor; a resin soluble in cold alcohol; a resin soluble in boiling alcohol; succinic acid; and a bituminous matter on which alcohol, ether, fixed and volatile oils, and alkaline solutions, exert no solvent action.

Properties and Uses.—Amber is not used as a medicine; its principal employment is in the preparation of its oil, and acid, and varnish. Amber varnish is made by roasting two pounds of Amber, and then dissolving it in three pounds of linseed oil, and a sufficient quantity of oil of turpentine.

Off. Prep.—Oleum Succini; Oleum Succini Rectificatum.

SULPHUR.
Sulphur.

SULPHUR SUBLIMATUM.
Sublimed Sulphur. Flowers of Sulphur.

SULPHUR LOTUM.
Washed Sulphur.

History.—Sulphur is an abundant natural production, occurring principally in volcanic districts, especially in Sicily, where it may be obtained in a state of purity, and often crystallized. It also occurs in the organized kingdom in both animals and plants, and in the inorganized kingdom in combination with gypsum, heavy-spar, and many other minerals, with oxygen as sulphuric acid, with hydrogen as sulphureted hydrogen, with mineral waters, imparting to them medicinal virtues, and also in the forming of sulphurets or sulphides with several metals.

For supplying the wants of medicine and the arts, Sulphur is obtained from two sources; one, imported from Sicily, and known as *Native* or *Volcanic Sulphur*, the other, prepared from the sulphurets of iron or copper, and known as *Pyritic Sulphur*, which is seldom employed in medicine. *Volcanic Sulphur* occurs in masses or crystals; the crystallized variety presents the form of very acute rhombic octaëdres, bright sulphur-yellow in color, and exceedingly pure. The massive Sulphur, has a grayish-yellow tint, rather less brittle and less lustrous than the preceding, with many grayish or bluish spots or streaks, arising from mineral impurities. From the volcanic Sulphur, pure Sulphur is prepared by distillation. *Crude Sulphur* is prepared by distillation of Sulphur from the Sulphur earths or metals; this, when purified by being again melted, allowing the impurities to settle, and then pouring the clearer Sulphur into long cylindrical molds, ten or fifteen lines in diameter forms the well known *Roll*, *Stick*, or *Cane Sulphur ;* and the impure, grayish residue left, when reduced to powder is known as *Horse Brimstone* (*Sulphur Vivum*). *Roll Sulphur* is now made by subliming the Sulphur in iron vessels, fusing the product, and casting it into cylindrical molds.

The best mode of purification is to sublime the Sulphur, pass the sublimed vapor into a close chamber of considerable size, where it condenses in fine impalpable powder, consisting of minute globules between a thirtieth and a two-hundredth of an inch in diameter, unless they have been exposed to light or agitation, when they are apt to present a crystalline structure. This is called *Flowers of Sulphur* or *Sublimed Sulphur*. *Washed Sulphur* is the Sublimed Sulphur well washed with boiling water to free it from acidity which is apt to be present, in consequence of the combustion some of it undergoes in the act of subliming, thereby giving rise to sulphuric acid. When properly washed, it is not affected by the action of the atmosphere. Crude Sulphur is imported principally from Sicily ; roll Sulphur from Marseilles.

Sulphur is a hard brittle substance, of greenish-yellow, dark-yellow, or brown-yellow color, and having a faint peculiar taste and odor. It is unchanged in the atmosphere, is a non-conductor of electricity, and develops negative electricity when rubbed. It is insoluble in water, is soluble in boiling oil of turpentine, bisulphuret of carbon, chloride of Sulphur, oils, alcohol, and ether. Its symbol is S ; its equivalent weight 16 ; and its sp. gr. when pure, from 1.97 to 2.00. It volatilizes at about 180°, giving off its peculiar odor, and when heated to between 224° and 230°, it passes into a state of fusion ; about 400°, or a little higher, the melted mass becomes thicker and brownish ; and if kept for some time at this temperature, or if it be suddenly cooled, as by throwing it into water, it remains quite soft, so that it may be drawn into threads ; in this state it is called *Soft Amorphous Sulphur*, which is capable of receiving and retaining delicate impressions of seals, coins, and the like.—*C.*—*P.* At 650° it sublimes unchanged, if oxygen be excluded. When exposed to the air, Sulphur inflames spontaneously at about 300°, and burns with a pale blue flame, emitting at the same time a great quantity of very strongly suffocating fumes. The combinations of Sulphur are many, and it forms one of the most potent among chemical agents.

Sulphur, from carelessness in its purification, may contain sulphuric acid, from which it should always be freed; this may be detected by agitating some of the sulphur in water, and testing the water with litmus-paper. It is sometimes adulterated with arsenic, which may be detected by converting the Sulphur and arsenic into sulphuric and arsenic acids, through the action of nitric acid and heat, neutralizing the acids by carbonate of soda, adding muriatic acid in excess, and transmitting sulphureted hydrogen for some minutes; upon which yellow sulphuret of arsenic will fall down.

Prof. J. W. Bailey, in Silliman's Jour., May, 1851, says: "Any substance containing Sulphur will yield an alkaline sulphuret if heated with carbonate of soda, either with or without the addition of carbonaceous matter, according as a deoxydizing action is or is not required. The magnificent purple which is then produced by the addition of the fused mass to a drop of the solution of the nitro-prusside of sodium will at once prove the presence of Sulphur." He adds that the smallest particle which can be conveniently supported on a platinum wire for blowpipe experiment, will thus distinctly manifest Sulphur, when present. M. Z. Roussin's method of preparing the nitro-prussiate of sodium is as follows: One part of ferrocyanide of potassium in powder is added to two parts of commercial nitric acid, diluted with an equal volume of water. The mixture, contained in a porcelain dish, is exposed to the heat of a water-bath, and is constantly agitated to promote the reaction which is accompanied by the disengagement of much gas, and especially of hydrocyanic acid. The decomposition is thus slowly effected, and when no more gas is given off, the liquid is to be exactly neutralized with carbonate of soda, while it is still maintained at the same temperature. An ochreous precipitate now separates, and afterward, on continuing the evaporation, white crystals appear on the surface of the liquid, while at the same time an odor of ammonia is developed. There is to be now added to the liquid an equal volume of rectified alcohol. The mixture is to be heated to the boiling point, and then thrown on to a filter. The deposited salt is to be washed with a little alcohol, and the filtered liquor submitted to spontaneous evaporation. Regular prisms, of a ruby-red color, consisting of nitro-prussiate of sodium will be speedily deposited. When the crystallization has proceeded for some time, the crystals are to be separated and dried. The mother-liquor will now yield crystals of nitrate of potassa and of soda, and the nitro-prussiate must be separated from these by treating the mixed salts with proof-spirit at 212°, when a further crop of crystals, as pure as the first, may be obtained.

Properties and Uses.—Sulphur is a stimulant, laxative, diaphoretic, alterative, and is considered a certain remedy in itch. It is used in hemorrhoids, diseases of the bladder, and in pregnancy as a mild cathartic, either alone, combined with cream of tartar, or with some other saline purgative. It is given alone in one or two drachm doses, in milk or molasses; or thirty grains of Sulphur combined with two drachms of bitartrate of potassa. One serious objection to its use is, that it renders the stools, and even the insensible transpiration, insupportably fetid; which arises from its being converted within the body into sulphureted hydrogen; if the Sulphur contains acid, its operation will be attended with more or less griping. It is probable that Sulphur is rendered soluble, and therefore absorbable by the soda of the bile.—*P.* In chronic catarrh, chronic rheumatism, cutaneous diseases, and in the chronic stage of pertussis, it may be administered two or three times a day, in doses of twenty or thirty grains.

Externally, Sulphur is used in various cutaneous diseases of the vesicular, scaly, or papular kind. Sulphur-baths are likewise found beneficial in scrofula, chronic palsy, chronic rheumatism, scabies, and all kinds of scaly cutaneous disorders; the sulphurous acid gas is applied to the body, the head being protected. The effects occasioned are warmth, redness, and pricking of the integuments, followed by considerable sweating and excitement of the circulation. If the gas should be inhaled, it will prove powerfully irritating to the glottis, and altogether irrespirable, even when diluted with atmospheric air. The effects of Sulphur, and of sulphurous acid in cutaneous diseases and rheumatism may be obtained by using the sulphuret of potassa in the form of bath, say two or three ounces to one hundred pounds of water.

Off. Prep.—Confectio Sennæ Composita: Ferri Sulphuretum; Potassæ Sulphas cum Sulphure; Potassii Sulphuretum; Sulphur Præcipitatum; Unguentum Sulphuris; Uuguentum Sulphuris Compositum; Vinum Cinchonæ Compositum.

SYMPHYTUM OFFICINALE.

Comfrey.

Nat. Ord.—Boraginaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE ROOT.

Description.—*Comfrey* has an oblong, fleshy, perennial *root*, black externally, and a pilose, herbaceous *stem*, three or four feet high, branching above, and winged by the decurrent bases of the pointed, wavy, rough-edged *leaves;* the *lower leaves* and *radical* are ovate-lanceolate, tapering into a petiole; the *upper* and *floral* lanceolate. The *flowers* are white or of a rose color, and disposed in terminal, revolute racemes. The *calyx* is five parted, with lanceolate, acuminate sepals; the *corolla* tubular-campanulate; *limb* with five recurved teeth. *Stamens* five, included; *anthers* elongated. *Style* filiform. *Nutlets* smooth, ovate, fixed by a large excavated (perforate) base. The whole plant is rough with dense hairs.—*W.—G.*

History.—Comfrey is a native of Europe, but naturalized in this country, growing on low grounds and moist places, flowering all summer. The root is officinal; when fresh it is glabrous, fusiform, branching, ten or twelve inches in length, by one in diameter, and very mucilaginous. The dried root, as found in the shops, is in pieces varying from one to four or five inches long, black and corrugated externally, dark whitish and corneous-like internally, nearly odorless, viscid, and slightly astringent. It contains a very little tannic acid, and a large amount of mucilage, which is readily extracted by water.

Properties and Uses.—This plant is demulcent and slightly astringent. With other mucilaginous agents, it is considered inert or of but little medical importance by many writers; but this is an erroneous view, the result of deficient investigation. All mucilaginous agents exert an influence on mucous tissues, hence the cure of many pulmonary and other affections, in which these tissues have been chiefly implicated, by their internal use. Physicians must not expect a serous disease to yield to remedies which act on mucous membranes only; and to determine the true value of a medical agent, they must first ascertain the true character of the affection, as well as of the tissues involved. Again, mucilaginous agents are always beneficial in scrofulous and anæmic habits. Comfrey root is very useful in diarrhea, dysentery, coughs, hemoptysis, other pulmonary affections, leucorrhea, and female debility; these being principally mucous affections. It may be boiled in water, wine, or made into a syrup, and taken in doses of from one to four fluidounces of the preparation, two or three times a day. Externally, the fresh root, bruised, forms an excellent application to bruises, ruptures, fresh wounds, sore breasts, ulcers, white swellings, etc.

Off. Prep.—Syrupus Araliæ Compositus; Vinum Symphytii Compositum.

SYMPLOCARPUS FŒTIDUS.

Skunk Cabbage.

Nat. Ord.—Araceæ. *Sex. Syst.*—Tetrandria Monogynia.

THE ROOT AND SEEDS.

Description.—This plant has been a troublesome one for botanists to dispose of; it has been variously annexed to *Ictodes*, *Dracontium*, and *Pothos*. Salisbury has termed it *Symplocarpus*, a name which is preferred by many botanists, and which it is deemed best to continue. It is a perennial plant, having a large, abrupt *root* or *tuber*, with numerous, crowded, verticillate, fleshy fibers, which extend some distance into the ground. The *spathe* appears before the leaves, which is ovate, turgid, various in width, cucullate, spotted and striped, with purple and yellowish-green, the top acuminate and incurved, the edges folded inward, auriculate at the base, and at length coalescing. The *flowers* which are dull purple, tetrandrous, and numerous, are within the spathe on an oval or subglobose, short pedunculated *spadix*. The *calyx* consists of four fleshy, wedge-shaped, truncate sepals, the top and edges inflected. *Corolla* none. *Stamens* four, opposite the sepals, with subulate *filaments*, equal in length to the calyx; and oblong, exserted, two-celled *anthers*. The *style* is four-sided, tapering; *stigma* minute, pubescent; *ovary* roundish, concealed within the spadix. After the spathe decays, the spadix continues to grow, and with it every part of the flowers except the anthers. When the fruit is ripe, the spadix has attained many times its original dimensions, while the calyx, filaments and style are larger, very prominent and separated from each other. Within the spadix, at the base of each style, is a naked, round, fleshy seed, as large as a pea, white, tinged with green and purple, invested with a separate membranous coat, and with a prominent embryo situated in a depression at top, and umbilicately attached to a large, solid perisperm. Sometime after the flowers, numerous, large, crowded *leaves* appear, which are oblong, cordate, acute, smooth, with numerous fleshy veins of a pale color, on long, channeled petioles, furnished with large oblong sheaths, bright-green, and often twenty inches long by twelve broad.—*L.—G.—W.*

History.—This is an indigenous plant, growing plentifully in various parts of the United States, in moist grounds, flowering in March and April, and maturing its fruit in August and September; it forms a roughened globular mass two or three inches in diameter, in decay shedding the bulblet-like seeds, which are from one-third to half an inch in diameter, and filled with the singular solid fleshy embryo.—*G.* The whole plant has an extremely disagreeable odor, and which has given rise to the several names of *Skunk-cabbage*, *Skunk-weed*, *Polecat-weed*, and *Meadow-cabbage*. The parts used are the roots and seeds. The roots should be gathered soon after the appearance of the spathe, or after the seeds have matured in autumn; it has the unpleasant odor of the plant, and when fresh a persistent acrid taste. As found in the shops it is in somewhat cylindrical pieces, two inches or more in length, and about one in diameter, or, more commonly, in transverse slices, very much compressed and corrugated. Its color externally is dark-brown, and internally whitish, or yellowish white. Drying lessens the odor, as well as the acridity of the plant, and age and exposure dissipate them entirely, consequently the root should be renewed annually. The seeds are frequently used and preferred, as being more energetic than the root; they have an exceedingly acrid taste, and emit the fetid odor of the plant, only when bruised. They preserve their virtues longer than the root. The properties of this plant are chiefly owing to a volatile substance which loses its activity by desiccation, and is completely volatilized by subjection to an increased temperature. Alcohol or water extracts its virtues, and the aqueous infusion should be made by displacement. Mr. Turner found it to contain a fixed oil, wax, starch, volatile oil and fat, etc.—*Am. Jour. Pharm. II.*, 1.

Properties and Uses.—In large doses, according to Bigelow, Skunk-cabbage will cause sickness at stomach, vomiting, headache, dizziness and impaired vision. In medicinal doses it is a stimulant, exerting expectorant, powerful antispasmodic, and faintly narcotic influences. It has been successfully used in asthma, hooping-cough, nervous irritability, hysteria, epilepsy, and convulsions during pregnancy and labor; likewise in chronic catarrh, pulmonary, and bronchial affections. The powdered root or seed may be given in doses of from ten to forty grains, three times a day; but the most eligible mode of administration is a saturated tincture of the fresh root, of which one or two fluidrachms may be given for a dose.

Off. Prep.—Pulvis Lobeliæ Compositus; Pulvis Asclepiæ Compositus; Tinctura Symplocarpi; Tinctura Lobeliæ Composita; Tinctura Lobeliæ et Capsici; Tinctura Sanguinariæ Composita; Tinctura Sanguinariæ Acetata; Tinctura Viburnii Composita.

TAMARINDUS INDICA.

Tamarind.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Monadelphia Triandria.

PULP OF THE PODS.

Description.—This is a large tree with many spreading *branches*, a stout, straight *trunk*, and a rough, ashy-gray *bark*, usually attaining the height of thirty or forty feet. The *leaves* are alternate and abruptly pinnated; the *leaflets* are in from twelve to fifteen pairs, opposite, subsessile, small, obtuse, entire, smooth on both sides, tapering a little, of a greenish-yellow color, and about six lines long by two broad; the inferior pair larger. The *petioles* are from four to six inches long, and channeled; *stipules* small, deciduous. In a cold, damp atmosphere, and also after sunset, the leaflets close themselves. The *flowers* are yellow, veined with red, are arranged in terminal and lateral racemes. *Bracts* obovate, colored, one-flowered, deciduous. *Corolla* somewhat papilionaceous, erect, unilateral, the length of the calyx, three-cleft. *Segments* ovate, acute, concave. *Calyx* four-leaved, cruciate, expanding, tubular at base, deciduous; limb bilabiate, reflexed; upper lip tri-partite; lower broad, two-toothed. *Vexillum* or *middle petal* oblong, its margins involute and curled; wings oval, margins curled. *Keel* two short subulate processes under the stamens. *Stamens* ten, seven very short and sterile, the others longer, monadelphous, bearing incumbent anthers. *Ovary* stalked, linear, with the subulate style much incurved; *stigma* obtuse. *Legume* oblong, pendulous, nearly linear, generally curved, somewhat compressed, filled with a firm, acid pulp, covered with a hard, scabrous bark, which never separates into valves; under the bark run three fibers, one down the upper concave margin, and the other two at equal distances from the inferior or convex edge. *Seeds* from six to twelve, somewhat trapeziform, compressed, covered with a smooth, hard, brown shell, and inserted into the convex side of the pericarp.—*L.*—*W. I.*

History.—The Tamarind tree inhabits both the East and West Indies; the pods of those in the latter country are shorter than the other, and fewer seeded. The part used is the fruit, which, when recent, has a pleasant acid taste. They are generally brought to this country as a kind of preserve, made by removing the epicarp, arranging the fruit in layers in a cask, and filling the interstices with syrup at 212°. As met with in this country, they are reddish-brown, have a sweet and agreeably acid taste, and consist of acid-syrup, seeds, *endocarp* and fibers; the acidity of the syrup is due to its admixture with the sarcocarp or pulp. The seeds should be solid and corneous, not soft and expanded, the fibers should be tough, and the whole appearance of the mass should be fresh and syrupy, not dried up from loss or lack of syrup, and without a moldy odor. Sometimes, from being prepared in copper vessels they may prove dangerous, but the presence of any of this metal may be known by the syrup giving a copperish-red color to a clean knife-blade. According to an old analysis by Vauquelin, they contain a little sugar, pectic acid, and parenchymatous fiber, with 9.4 per cent. of citric acid, 1.5 of tartaric acid, 0.5 of malic acid, and 3.25 of bitartrate of potassa. It readily parts with its properties to water.—*C.*

Properties and Uses.—Tamarind-pulp is useful to allay thirst, and is nutritive and refrigerant; in large quantity, laxative. On this account it forms a useful and agreeable drink in febrile and inflammatory diseases; and, with persons recovering from sickness, to keep their bowels regular, it may form a portion of their diet. A convenient cooling laxative is Tamarind-whey, made by boiling an ounce of the pulp in a pint of milk, and straining the product. Combined with senna, or resinous cathartics it is said to diminish their cathartic operation.—*P.* Dose, from a drachm to two ounces.

TANACETUM VULGARE.

Tansy.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE HERB.

Description.—Tansy has a perennial, moderately creeping *root*, and an erect, herbaceous, somewhat six-sided, leafy, solid, striated, smooth *stem*, one to three feet in height, and branched above into a handsome corymb of flowers. The *leaves* are smoothish, dark-green, doubly and deeply pinnatifid; the *segments* are oblong-lanceolate, pinnatifid and incisely serrate; the margined *petiole* cut-toothed. The *flowers* are golden-yellow, and arranged in dense, terminal, many-headed, fastigiate corymbs; *disk-florets* five-cleft, perfect; *ray-florets* few, trifid, pistillate. *Scales of the involucre* scarious at the apex, small, obtuse, imbricated. The *pappus* short, equal, membranous, five-lobed; *achenia* with a quadrangular entire crown. There is a variety called *Double Tansy*, *Tanacetum Crispum* with crisped and dense leaves.—*L.*—*W.*—*G.*

History.—Tansy is indigenous to Europe, but has been introduced into this country; it is cultivated by many, and also grows spontaneously in old grounds, along roads, etc., flowering in the latter part of summer. The whole plant is officinal; it has an unpleasant, aromatic odor, and a strong, rather pungent and bitter taste, which properties it owes to a yellow or greenish volatile oil, which possesses, in a strong degree, the taste and odor of the plant, a sp. gr. of 0.952, and ultimately deposits a camphor. Its medicinal virtues are extracted by alcohol, ether, chloroform, and by water in infusion. Drying impairs much of its activity. Peschier found the leaves to contain volatile oil, fatty oil, wax, or stearine, chlorophyll, bitter resin, yellow coloring matter, tannin with gallic acid, bitter extractive, gum, woody fiber, tanacetic acid. The bitter matter is the substance usually denominated extractive; but according to Peschier, it is in part resin. Tanacetic acid is crystallizable, and precipitates lime, baryta, and oxide of lead, and causes a precipitate with a solution of acetate of copper.—*P.*

Properties and Uses.—Tansy is tonic, emmenagogue and diaphoretic. In small doses, the cold infusion will be found useful in convalescence from exhausting diseases, in dyspepsia with troublesome flatulence, hysteria, jaundice, and worms. A warm infusion is diaphoretic and emmenagogue, and has been found beneficial in intermittent fever, suppressed menstruation, tardy labor-pains, and as a preventive of the paroxysms of gout. The seeds are reputed the most efficient for worms. The oil is likewise used as an anthelmintic, and as an abortive; but for this last purpose it is highly dangerous. Tansy is much employed in the form of fomentation to swellings and tumors, local inflammations, etc., and applied to the bowels in amenorrhea, and painful dysmenorrhea. The vinous infusion is said to be beneficial in strangury, and other urinary obstructions, and in debility of the kidneys. The dose of the powder is from thirty to sixty grains, every three or four hours; of the infusion, from one to four fluidounces; of the tincture, one or two fluidrachms; of the oil, from two to ten drops. A very pleasant compound tincture may be made, by adding Tansy *two ounces*, Swamp Milk-weed *one ounce*, Unicorn Root, and Prickly Ash Berries, of each, *half an ounce*, to *two pints* of Diluted Alcohol; let them macerate for 14 days, and filter. This is useful as a vermifuge and tonic, and may be given to a child two or three years old, in doses of a teaspoonful three or four times a day, in some sweetened water.

Off. Prep.—Infusum Tanaceti; Tinctura Laricis Composita.

TARAXACUM DENS-LEONIS.

Dandelion.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This plant is placed in the Natural Order *Cichoraceæ* by Lindley, and is the *Leontodon Taraxacum* of Linnæus. It is an herb, with a perennial, tap-shaped, very milky *root*, with a dull-brownish epidermis. The *leaves* are all radical, numerous, spreading, of a bright, shining green, quite smooth, tapering downward, sessile, pinnatifid, with runcinate, sharp, unequally toothed lobes. The *scape* or *flower-stem*, is longer than the leaves, erect, round, smooth, brittle, naked, hollow, five or six inches in height, and bearing a single yellow head. The *flowers* are of a uniform golden-yellow, and in round heads an inch and a half in diameeter, expanded in the morning and fine weather only. The *involucre* is double; external scales small, closely pressed, spreading or reflexed; internal ones in one row, erect, linear; all frequently callous-horned at the apex. The *florets* are numerous, strap-shaped, equal, and five-toothed. *Stamens* with hair-like filaments. *Receptacle* naked, convex, dotted. *Ovary* obovate; *style* slender, cylindrical; *stigmas* two, revolute. *Achenia* oblong or linear-obovate, blunt and squamously muricated at the summit, longitudinally striated, with a long beak; *pappus* white, hair-like, very soft, simple, radiated in many rows. After blossoming the inner involucre closes for a time, the slender beak elongates and raises up the pappus while the fruit is forming, the whole involucre is then reflexed, exposing to the wind the naked fruits with the pappus displayed in an open globular head nearly two inches in diameter—*L.*—*G.*— *W.*

History.—This plant is a native of Greece, but is now found growing abundantly in Europe, and this country, in fields, gardens, and along road-sides, flowering from April to November. There are some other species recognized by botanists, but which appear to possess the same medicinal powers. The young leaves are frequently used as a salad, or greens. The whole plant exudes a white, bitter juice when broken or wounded, whose sensible qualities are said to be greater during the period of inflorescence. The root only is the officinal part, which should be collected while the plant is in flower. When recent it is from three to five inches, or more, in length, from three to nine lines in diameter, tap-shaped, fleshy, dull yellow or brownish externally, white internally, inodorous, and bitter. As found dried in the shops, it is considerably diminished in size, having lost more than half its weight, is corrugated lengthwise, friable, odorless, with a bitter, viscid taste. Alcohol or boiling water extracts its properties. Sprengel found the leaves and stem consist of 85 parts of water, 9.140 of albumen, mucilage, gum, and sugar, 3.091 of matters extractible by dilute caustic potassa, 0.100 of wax, resin, and chlorophyll, and 2.669 of fiber.

The milky juice of the root was found by John to contain caoutchouc, bitter matter, traces of resin, sugar, and gum, free acid, phosphates, sulphates, and hydrochlorates of potassa and lime, and water. Squire found in it, gum, albumen, gluten, an odorous principle, extractive, and a peculiar crystallizable principle soluble in alcohol and water.—*P.* A neutral crystalline, very bitter principle, which may be obtained in stellated and dendritic masses has been found by Polex, which he called *taraxacin;* it has a bitter, somewhat acrid taste, and is soluble in alcohol, ether, and boiling water. It is fusible, inflammable, burns without developing ammonia, and forms colorless solutions with concentrated acids. To obtain it, receive the fresh milky juice in distilled water, remove the albumen and resin by boiling, filter and slowly evaporate to form crystals. These may be purified by washing and by solution in either alcohol or distilled water, and re-crystallizing.—*Pharm. Jour. and Trans. I.*, 425. Dandelion root should always be used in the recent state; drying, as well as long boiling destroys its virtues.

Properties and Uses.—Dandelion-root when dried possesses but little medicinal virtue; when recent, it is a stomachic and tonic, with slightly diuretic and aperient actions. It has long been supposed to exert an influence upon the biliary organs, removing torpor and engorgement of the liver as well as of the spleen. It is also reputed beneficial in dropsies owing to want of action of the abdominal organs, in uterine obstructions, chronic diseases of the skin, and impairment of the digestive functions. It should not be used by those whose digestive organs are weak, as it is apt to occasion dyspepsia, flatulence, pain and diarrhea. The addition of cream of tartar to its decoction will render it more diuretic and laxative. As far as my own experience with this article goes, I think its virtues have been overrated. The existence of an irritable condition of the stomach or bowels, or acute inflammation contra-indicate its employment. Dose of the decoction. one or two fluidounces; of the extract, from five to thirty grains.

Off. Prep.—Decoctum Taraxaci; Extractum Taraxaci; Extractum Taraxaci Fluidum; Pilulæ Taraxaci Compositæ.

TELA ARANEÆ.

Cobweb. Spidersweb.

History.—The medicinal species of spider, from which the web is obtained is the *Tegenaria Medicinalis*, belonging to the division *Homogangliata*, class *Arachnida.* They are found in angles of walls, corners of fences, old houses, barns, etc., where they weave a large, angular, nearly horizontal web, at the upper part of which is a tube in which they keep themselves perfectly at rest, until the web has ensnared a fly or other prey. The field spider's web is said to be of no account, medicinally, while that of the house spider is considered very useful. There are various opinions among medical men as to the modus operandi of cobweb, some attributing it entirely to the control of the imagination, while others view it in a different light, and entertain favorable opinions of it as a powerful therapeutical agent.

Properties and Uses.—Febrifuge, sedative, and antispasmodic. Said to have been found useful in the cure of intermittents when all other agents have failed; also recommended in several nervous affections, to relieve pain, lessen spasmodic action, and cause sleep, without any deleterious narcotic influences. Dr. Robert Jackson used it in the delirium, pains, spasms, and subsultus, common in continued fevers, in dry, nervous coughs, hiccough, etc. It has also been reputed efficacious in hysteria, periodical headache, chorea, asthma, morbid wakefulness and restlessness, and muscular spasms. The dose is five or six grains, rolled up in the form of a pill, and repeated three or four times a day. It has been applied to fresh wounds to check hemorrhage, and has been used as a plug to the nostrils in cases of long-continued and obstinate epistaxis.

The small silver-headed spider, given in a dough pill, is said to be a prompt and efficacious cure for ague.

TEPHROSIA VIRGINIANA.

Hoary Pea.

Nat. Ord.—Leguminosæ. *Sex. Syst.*—Diadelphia Decandria.

THE ROOT.

Description.—This plant has several other names as *Cat-gut*, *Goat's Rue*, and *Devil's Shoe-string*, by which last name it is more commonly known in the South. It is indigenous, with a perennial *root*, and a simple, erect, villous *stem*, growing from one to two feet high. The *leaves* are unequally pinnate; the *leaflets* are numerous, fifteen to twenty-nine, crowded, linear-oblong, acuminate, straight-veined, the odd one oblong-obcordate—they are about an inch in length by two or three lines in breadth; the petiolules are about a line long. The *stipules* are subulate, one-third of an inch long, deciduous. *Flowers* large, yellowish-white, marked with red-purple, in a dense, terminal, subsessile *raceme*. *Calyx* very villous, with five, nearly equal, subulate teeth. *Banner* roundish, usually silky outside, white; *keels* obtuse, rose-colored, cohering with the red *wings*. *Legume* flat, linear, falcate, villous, many-seeded.—*W—G.*

TEPHROSIA ONOBRYCHOIDES (Nutt).—Pilose with somewhat rusty hairs. *Stem* stout, erect, flexuous, more or less branched, and about two feet high. *Leaflets* thirteen to seventeen, nearly smooth above, silky-hirsute beneath, cuneate-oblong, obtuse or retuse, and mucronate at the end, an inch or more long, one-fourth as wide; *stipules* free, subulate. *Raceme* very long (one or two feet), terminal, nearly opposite the leaves, many flowered; *flowers* small, red and white. *Calyx* villous-hispid, teeth triangular, the lowest subulate, exceeding the others. *Legume* two inches long, slightly falcate, eight to twelve seeded.—*W.*

History. — Each of the above plants is known in the South by the common name of *Devil's Shoe-string.* Several varieties of the plant are found growing in dry sandy soils from Canada to Florida, and from Illinois and Missouri to Texas, all of which, probably, possess similar medicinal powers. The two plants above described are the ones more commonly used. They flower in June and July. The root is of a light drab color, from a foot and a half to two feet or more in length, and varying in thickness from one-eighth to three-eighths of an inch; it is crooked, not much branched, gradually tapering, with a very few, scattering fibers. Internally its color is whitish yellow. The root is hard, breaks with a short cottony fracture, as may be seen by examining the fractured end with a pocket lens, has a faint spicy odor, and a spicy, faintly sweetish and slightly astringent taste, succeeded by a moderate degree of pungency. It yields its virtues to water or alcohol.

Properties and Uses.—The root of this plant alone, or in combination with other agents, has been found a very efficacious remedy in syphilis; many Southern practitioners have spoken of it to me in the highest terms, as an antisyphilitic. The decoction is also much used as a vermifuge, and is said to be as efficient and powerful as the Spigelia. According to Dr. B. O. Jones, the plant is a mild, stimulating tonic, having a slight action on the bowels, and the secretive organs generally, and applicable in the treatment of many diseases, especially in a certain stage of typhoid fever, where there is little use of active medicine. He recommends the following Compound Fluid Extract of Tephrosia: Take of Tephros. Virg. (the plant) eight ounces, Rumex Acutus (Dock) two ounces, Water four quarts. Place the plants in the water and boil till it is reduced to one quart. Strain, and when intended to be kept, mix with an equal bulk of brandy or diluted alcohol, and half its weight of sugar, macerate for several days, and strain through muslin. The dose is from half a fluidounce to a fluidounce, two, three, or four times a day.—*Am. Jour. Pharm., Vol. XXVIII.*, 218.

THEA CHINENSIS.

Tea.

Nat. Ord.—Ternstromiaceæ. *Sex. Syst.*—Monadelphia Polyandria.

THE LEAVES.

Description.—The Tea-plant, *Thea Chinensis*, is an evergreen shrub, when uncultivated reaching even to thirty feet in height, but seldom attaining more than six or seven feet when under cultivation. There are two varieties of this plant, admitted by botanists, the *Thea Viridis*, Green Tea, and the *Thea Bohea*, Black Tea.

THEA VIRIDIS has many alternate, bright brown and smooth *branches*, green and downy when young. The *leaves* are alternate, bright deep-green, oval or oval-lanceolate, short-stalked, very convex, serrated, entire toward the base, and at the apex, which is acuminate and emarginate; shining on both sides, and blistered when old, slightly downy beneath. The *flowers* are small, white, axillary, solitary, with a rather heavy odor. The *corolla* consists of from five to nine petals, unequal, the outer one shorter. *Calyx* without bracts, five-cleft, segments imbricated, equal. *Stamens* numerous, smooth, adhering to the very base of the petals; *filaments* white, awl-shaped; *anthers* rounded, reniform, opening at the base. *Ovary* ovate, pubescent; *style* simple at the base, trifid above. *Capsule* spheroidal, three-celled, often by abortion one or two celled; *cells* opening at the apex, one, or rarely, two seeded. *Seeds* spheroidal, wingless.—*L.*

THEA BOHEA, very much like the last; but the *leaves* are flatter, smaller, darker-green, with small serratures, and terminating gradually in a point, not at all acuminate or emarginate.—*L.* *Flowers* axillary, several together.

History.—The Tea-plant inhabits Eastern Asia, and is extensively cultivated in China both for home use and exportation. The Japanese, as well as some of the neighboring nations also cultivate it to a certain extent. There are two kinds of Tea imported into this country, *Green Tea*, and *Black Tea*, and of each of these two, there are several varieties. Thus, of Green Tea, we have *Twankay*, *Hyson-skin*, *Young Hyson*, *Old Hyson*, *Imperial*, and *Gunpowder;* of Black Tea, we have *Bohea*, *Congou*, *Campoi*, *Souchong*, *Caper*, and *Pekoe.* The leaves of Green Tea have a dark bluish-green color, a pleasant, somewhat fragrant odor, and a bitterish, slightly astringent, somewhat herbaceous taste; they impart their peculiar taste and odor to boiling water by infusion, forming an agreeable and invigorating drink. According to Dr. Hassal, who has subjected the various kinds of Tea to microscopical and chemical examinations, but little unadulterated Tea is exported from China. He found that the Chinese adulterated Tea with the leaves of the ash, plum, camellia sasanqua, chloranthus inconspicuus, and other plants; colored them with indigo, Prussian-blue, turmeric, etc., and glazed them with graphite, plumbago, etc. In addition to this, there are unprincipled dealers, who do not hesitate to still further adulterate Teas after their importation.

The leaves of Black Tea are much darker colored than those of Green, and their taste and odor is not so pleasant, and to some persons are very offensive. They form a brownish infusion with boiling water. Black Teas also undergo adulteration by the Chinese to a considerable extent. Mulder found Tea to consist of—

	GREEN.	BLACK.
Essential oil (to which the flavor is due).......	0.79	0.60
Chlorophyll..	2.22	1.84
Wax..	0.28	——
Resin..	2.22	3.64

Gum	8.56	7.28
Tannic acid	17.80	12.88
Theine	0.43	0.46
Extractive	22.30	19.88
Extractive, dark colored	——	1.48
Colorable matter, separable by hydrochloric acid	23.60	19.12
Albumen	3.00	2.80
Vegetable fiber	17.08	28.32
Ash	5.56	5.24
	100.0	100.0

The *theine* is obviously much underrated in Mulder's analysis. According to Stenhouse, the Teas of commerce contain, on an average, about two per cent. of theine. M. Peligot procured over four per cent. of theine by the following process: To the hot infusion of green Tea, subacetate of lead, and then ammonia, were added; the liquid was filtered, and the lead separated by means of sulphureted hydrogen; after a second filtration, the clear liquid, being evaporated at a gentle heat, afforded, on cooling, an abundant crop of crystals. By re-evaporation of the mother-liquid more crystals were procured, amounting altogether to from five to six per cent. Theine, when pure, crystallizes in fine needles, glossy, like white silk; the crystals lose eight per cent. of their weight, or two atoms of water of crystallization, at 212°; they are bitter, but have no smell, melt at 550°, sublime at 543°, without decomposing; dried at 350°, they dissolve in 98 parts of water, 97 of alcohol, and 194 parts of ether. It is a feeble base, being precipitable from its solutions by tannic acids alone. (*See " Adulterations Detected, etc., by Arthur Hill Hassall, M. D." p.* 65 *to* 104.)

Properties and Uses.—Tea is a mild stimulant and astringent; used in moderation, the infusion, when not too strong, is a harmless and refreshing beverage. As to its effects upon the constitution there is quite a diversity of opinions, but it is very probable that with healthy persons no pernicious influences arise from its use, unless taken in large quantities, or very strong. It is very agreeable to the invalid when made into a weak infusion; and may be used in fevers and inflammatory diseases when it is desired to check sleep. In colds, catarrhs, and slight attacks of rheumatism, warm Tea is taken as a diluent, diuretic, and diaphoretic. It frequently relieves headache, and allays the irritation of the stomach produced by the intemperance of the previous day. With some persons, however, Tea produces very unpleasant nervous symptoms, as tremors, anxiety, headache, sleeplessness, etc. Tea is said to be a sedative to the heart and bloodvessels; and Liebig considers it to possess considerable nutritive powers. Black Tea is generally preferred by those of weak or delicate nerves, on account of its being less apt to produce disagreeable nervous symptoms. Externally the infusion has been used with advantage as a collyrium.

Off. Prep.—Lotio Hydrastis Composita.

THUJA OCCIDENTALIS.

Arbor Vitæ.

Nat. Ord.—Pinaceæ. *Sex. Syst.*—Monœcia Monadelphia.

THE LEAVES.

Description.—This tree, also called *False White Cedar*, from its resemblance to the *white* cedar (*Cupressus Thyoides*), is indigenous to this country, and attains the height of from thirty to fifty feet. The *trunk* is crooked, rapidly diminishing in size upward, throwing out recurved *branches* from base to summit; the *branches* ancipital, flat and broad. The *wood* is very light and soft, but exceedingly durable. The *leaves* are evergreen, rhomboid-ovate, with a gland on the back, squamose, appressed, imbricated in four rows. *Cones* terminal, oblong, nodding; *scales* pointless, one-seeded; *seeds* broadly winged.—*W.*—*G.*

History.—This evergreen tree grows wild in various parts of the United States from Canada to Carolina, on the rocky borders of streams and lakes, and in swamps, flowering in May. It abounds especially in Canada and the Northern States; it is said to attain only the height of thirty-six feet, and fourteen inches diameter, when one hundred and fifty years old. The leaves and twigs are employed; they have a pleasant, benzoinic odor, and a pungent, bitterish, aromatic taste. A yellowish-green, pungent, aromatic, essential oil may be procured from them by distillation. Water or alcohol extracts their virtues.

Properties and Uses.—A decoction of the leaves has been used in intermittent fever, remittent fever, coughs, rheumatic and scorbutic affections, etc. Made into an ointment with lard or other animal fat, the fresh leaves are useful as a local application in rheumatic and neuralgic affections; a poultice of the cones and powdered Podophyllum in milk, will, it is asserted, remove the worst rheumatic pains. The oil has been successfully employed as a vermifuge. The expressed juice or tincture of the leaves is highly recommended as an application to condylomata, removing these growths in from three to four weeks. The tincture to be made by bruising an ounce of the fresh leaves, and macerating it for several days in half a pint of alcohol. The condylomata should be kept constantly moistened with the tincture by means of lint dipped in it. By some it is said to act as a powerful excitant, others again deny this.

The Chinese use a *tea-oil* for lamps and as an article of food; it is pale yellow, nearly odorless, of sp. gr. 0.927, burns with a clear white flame, is slightly soluble in ether, but insoluble in alcohol or water. It is however, not obtained from the seeds of the tea-plant, but from various species of the genus *Camella*, as the *C. Oleifera*, or *C. Sesangua*.

THYMUS VULGARIS.

Thyme.

Nat. Ord.—Lamiaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE HERB.

Description.—Thyme is a small undershrub, with erect, suffruticose, numerous, branched *stems*, procumbent at base, and from six to ten inches in height. The *leaves* are oblong-ovate and lanceolate, numerous, revolute at the sides. The *flowers* are bluish-purple, small, and in terminal, leafy, whorled spikes.—*W.*

The THYMUS SERPYLLUS, Wild Thyme or *Mother of Thyme*, with a decumbent *stem*, flat, entire, elliptical, punctate, obtuse, and petiolate *leaves*, ciliate at base, and purple, spotted, capitate *flowers*, has similar virtues to the above.—*W.*

History.—These two plants are natives of Europe, introduced into this country, and extensively cultivated in gardens as culinary plants, especially the T. Vulgaris; they blossom during the summer. The whole herb is used; it should be collected when in flower, and carefully dried. It has a strong, pungent, spicy, rather pleasant taste and odor, both of which are retained by careful drying. These properties are due to a reddish-brown volatile oil, procured by distilling the plant with water. Its specific gravity is similar to that of the oil of origanum, for which it is frequently substituted. The herb yields its virtues to alcohol, or to boiling water by infusion. M. Lallemand found the oil to contain a large quantity of *thymol* or stearoptene; it is crystalline, melts at 108° F., and will remain liquid for a considerable time at the ordinary temperature, has no rotatory action on polarized light, and has the formula $C_{20} H_{14} O_2$. *Thymene*, the other constituent of oil of Thyme, is isomeric with turpentine, has no rotatory action on polarized light, and has the formula $C_{20} H_{16}$.

Properties and Uses.—Thyme is tonic, carminative, emmenagogue and antispasmodic. The cold infusion is useful in dyspepsia with weak and irritable stomach, and as a stimulating tonic in convalescence from exhausting diseases. The warm infusion is beneficial in hysteria, dysmenorrhea, flatulence, colic, headache, and to promote perspiration. Occasionally the leaves have been employed externally, in fomentation. The oil is valuable as a local application to neuralgic and rheumatic pains; and internally, to fulfill any of the indications for which the plant is used. Dose of the infusion, from one to three fluidounces; of the oil, from two to ten drops on sugar, or in emulsion. Thyme, Scullcap, and Rue, of each, *two ounces*, Peony and Black Cohosh, of each, *one ounce*, macerated for fourteen days in Diluted Alcohol, and then filtered, forms a good preparation for nervous and spasmodic diseases in children; it may be given in teaspoonful doses to a child three years old, repeating it three or four times a day, sweetening and diluting it if desired.

TRIFOLIUM PRATENSE.

Red Clover.

Nat. Ord.—Fabaceæ. *Sex. Syst.*—Diadelphia Decandria.

THE BLOSSOMS.

Description.—Red clover is a biennial plant with several *stems* arising from the same root, ascending, somewhat hairy, and varying much in its height. The *leaves* are ternate; the *leaflets* oval or obovate, entire, nearly smooth, often notched at the end, and lighter colored in the center. The *stipules* are ovate, mucronate. The *flowers* are red, fragrant, and disposed in short, dense, ovate, sessile *spikes* or *heads*. The *corollas* unequal, monopetalous; the *lower tooth of the calyx* longer than the four others, which are equal, and all shorter than the rose-red corolla.—*W.*—*G.*

History.—This plant is common to the United States, being extensively cultivated in grass lands, with herds-grass (*Phleum Pratense*) and other grasses, and often alone; it flowers throughout the summer. The blossoms or flowers are the parts used. A strong decoction is made of them, which is evaporated to the consistence of an extract.

Properties and Uses.—The extract spread on linen or soft leather, is said to be an excellent remedy for cancerous ulcers. It is also highly recommended in ill-conditioned ulcers of every kind, and deep, ragged-edged, and otherwise badly conditioned burns. It possesses a peculiar soothing property, proves an efficacious detergent, and promotes a heathful granulation.

There are two other varieties of Clover which are occasionally employed by practitioners, viz.: the *Melilotus Officinalis*, of Willdenow, or *M. Vulgaris*, of Eaton,—Yellow Melilot Clover, with an erect, sulcate *stem*, about three feet high, with spreading *branches*. The *leaves* are pinnately trifoliate; *leaflets* obovate-oblong, obtuse, smooth, with remote, mucronate teeth. The *flowers* are yellow, and disposed in one-sided, spicate, axillary, loose, paniculate racemes; *calyx* half as long as the corolla; *legume* ovoid, two-seeded. It is an indigenous annual, growing in alluvial meadows, and flowering in June. The whole plant is scented, having nearly the odor of the sweet-scented vernal grass, *Anthoxanthum Odoratum*. The other is the *Melilotus Leucantha*, of Koch, *M. Alba*, of Nuttall, and *Trifolium Officinale*, of Linnæus,—White Melilot Clover, or sweet-scented Clover, a biennial, with an erect, robust, very branching, sulcate *stem*, from four to six feet high; *leaflets* variable, oval, ovate, ovate-oblong, truncate, and mucronate at the apex, remotely serrate, and one or two inches long; *stipules* setaceous. The *flowers* are white, numerous, the racemes more loose and longer than in the preceding species. *Petals* unequal, banner longer than wings or keel; *calyx* shorter than the corolla by more than one-half. This plant grows in similar situations with the last, flowering in July and August, and having a sweet fragrance, which is improved upon being dried.—*W.* The leaves and flowers of these two plants are boiled in lard, and formed into an ointment, which is found of utility as an application to all kinds of ulcers. The *Vanilla* or *Seneca Grass*, used for a stimulant purpose, is the *Hierochloa Borealis.*

TRILLIUM PENDULUM.

Bethroot.

Nat. Ord.—Trilliaceæ. *Sex. Syst.*—Hexandria Trigynia.

THE ROOT.

Description.—This is one of an extensive genus of North American, herbaceous, perennial plants, which are variously known under the names of *Wake-Robin*, *Birth-root*, *Indian Balm*, *Lamb's Quarter*, *Ground Lily*, etc. It has an oblong, tuberous *root*, from which arises a slender *stem*, from ten to fifteen inches in height. The *leaves* are *three* in number, whorled at the top of the stem, suborbicular-rhomboidal, abruptly acuminate, from three to five inches in diameter, and on petioles about a line in length. The *flowers* are white, solitary, terminal, cernuous, on a recurved peduncle from an inch to two and a half inches long. The *sepals* are green, oblong-lanceolate, acuminate, an inch long; the *petals* are oblong-ovate, acute, and an inch and a quarter in length by half an inch broad. *Styles* three, erect, with recurved stigmas.—*B.*—*W.*

History.—This plant is common to the Middle and Western States, growing in rich soils, in damp, rocky, and shady woods, and flowering in May and June. Nearly all the species of the genus Trillium, are medicinal, and possess analogous properties; and among them the *T. Erythrocarpum*, *T. Grandiflorum*, *T. Sessile*, *T. Erectum* and *T. Nivale*, are the most common, and consequently the most frequently collected and employed. These plants may generally be known by their three verticillate, net-veined leaves, and their solitary, terminal flower, which varies in color in the different species, being white, red, purple, whitish-yellow, or reddish-white; the peduncle will also be found erect in some species, and recurved in others. The roots of these plants are oblong or terete, somewhat tuberous, dark or brownish externally, white internally, from one to five inches in length, and from half an inch to an inch and a half in diameter, beset with a few branching fibers laterally. They have a faint, slightly terebinthinate odor, and a peculiar aromatic and sweetish taste; when chewed they impart an acrid astringent impression in the mouth, causing a flow of saliva, and a sensation of heat in the throat and fauces. The rootlets have but little of the acrimony of the root. Prof. E. S. Wayne of Cincinnati, observes that if tincture of iodine be added to the white internal surface of the root, it strikes a deep blue color, indicating the presence of starch in abundance. The root contains volatile oil, gum, resin, extractive, tannic acid, and starch. It yields its active principles to water, and its tonic and stimulant virtues to diluted alcohol. The acrid principle of this root, *Trilline*, was obtained by Prof. Wayne as follows: A tincture made by displacement, was evaporated, to which water was added as the alcohol passed away. Upon cooling, a very fluid oleo-resin floated upon the surface of the water, of a light-brown color, and having the odor but not the acridity of the root. The acrid watery portion having been separated from the oil, both acetate and subacetate of lead was added as long as a precipitate was produced, the lead precipitate was then removed by filtration, and the excess of lead removed by the careful addition of sulphuric acid. The clear filtrate, being still acrid, was allowed to stand for twenty-four hours, when a gelatinous precipitate took place, the fluid losing its acridity. This precipitate was separated by filtration, carefully washed with water, as water appeared to remove some portion of it, and allowed to become almost dry on the filter, when it was dissolved in dilute alcohol and left to spontaneous evaporation. It formed a dry white, amorphous mass, easily powdered, powerfully acrid, soluble in alcohol, and, in quantity of half a grain to two ounces of water, formed a persistent, frothing, soap-like mixture. Its tincture brushed on glass and dried, was easily detached in glistening scales.—*Am. Jour. Pharm. XXVIII.*, 512.

Properties and Uses.—Bethroot is astringent, tonic, and antiseptic; it has been employed successfully in hemoptysis, hematuria, menorrhagia, uterine hemorrhage, leucorrhea, cough, asthma, and difficult breathing, and is said to have been much used by the Indian women to promote parturition. The astringent varieties of Trillium have been found useful in hemorrhages; the acrid species in chronic affections of the membranes lining the air-passages, phthisic, hectic fever, etc. All the varieties have been found efficient, either internally or externally, in chronic mucous discharges, leucorrhea, menorrhagia, etc. Boiled in milk, it has been administered with benefit in diarrhea and dysentery; and an infusion of equal parts of Trillium and Lycopus Virginicus, has been highly recommended for the cure of diabetes. Externally, the root made into a poultice, is very useful in tumors, indolent or offensive ulcers, anthrax, buboes, stings of insects, and to restrain gangrene. In some instances its efficacy has been increased by combination with bloodroot. Mr. W. S. Merrell states that the red Bethroots will check ordinary epistaxis, by merely smelling the freshly exposed surface of the recent root, and he supposes therefore that they contain an astringent principle of a volatile nature. The leaves of the Beth-plants, boiled in lard have been much used, in some sections of country, as an application to ulcers, tumors, etc. Dose of powdered Bethroot one drachm, to be given in hot water; of the strong infusion, which is the most common form of administration, from two to four fluidounces. These plants undoubtedly possess active properties, and deserve further investigation.—The *Trilline*, prepared as named above by Prof. Wayne, has not been used in medicine; but a less active agent has been sold under the same name, which is of an inferior quality.

TRIOSTEUM PERFOLIATUM.

Fever-root.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Monogynia.

BARK OF THE ROOT.

Description.—This plant is known also by the names of *Wild Ipecac.*, *Horse-Gentian*, *Wild Coffee*, and *Dr. Tinker's Weed.* It is indigenous, with a perennial, thick and fleshy *root*, subdivided into numerous horizontal branches. The *stems* are several from the same root, simple, stout, erect, round, hollow, soft, pubescent, and from two to four feet high. The *leaves* are opposite, oval-acuminate, mostly connate, entire, abruptly contracted at base, nearly smooth above, pubescent beneath, prominently veined, and six inches long by three broad; in some plants the upper leaves are almost amplexicaul. The *flowers* are of a dull purple color, axillary, sessile, mostly in clusters of three or five in the form of whorls, rarely solitary. The *calyx-tube* is ovoid; *limb* five-parted, segments linear-lanceolate, leaf-like, persistent, having a solitary bract; *corolla* tubular, gibbous at the base, somewhat equally five-lobed, scarcely longer than the calyx. *Stamens* five, included; *filaments* hairy. *Ovary* inferior; *style* long, slender; *stigma* capitate, lobed. The *fruit* is an oval berry, about nine lines long and six thick, of an orange-red or purple color when ripe, hairy, somewhat three-sided, crowned with the persistent calyx, three-celled, each cell containing a hard, bony, furrowed seed.—*W.*—*G.*—*B.*

History.—Fever-root is found throughout the United States, in limestone and rich soils, in shady locations, and among rocks, flowering from May to August. The root is the officinal part. It is of a dirty yellowish-brown color externally, about a foot and a half long, and about nine lines in diameter, whitish internally, sends out fibers, has a nauseous smell, and a disagreeably amarous taste. When dried it is readily reduced to powder. Its virtues are imparted to water, alcohol, or ether. It has not been analyzed. The *Triosteum Angustifolium*, smaller than the above, with a bristly, hairy *stem*, lanceolate, and sub-connate *leaves*, tapering to the base, *peduncles* opposite, one-flowered, and *flowers* of a greenish-cream color, possesses analogous properties, and may be substituted as an equivalent for the above.—*W.*

Properties and Uses.—The bark of the root is emetic when recent, or when administered in large doses of the powder. In doses of from a scruple to a drachm, the powder is a mild, but slow cathartic, with a tonic influence. In the early stages of fever, it may be given in all cases where a gentle action on the bowels is desired. It has been recommended as a laxative-tonic in dyspepsia, and autumnal fevers, also in hysteria, hypochondria, and convalescence after febrile diseases. Some have stated it to possess diuretic properties, and have employed it in chronic rheumatism with success. Rafinesque considers the leaves to be diaphoretic. The hard seeds are said to be very similar in flavor to coffee, when roasted and ground. Dose of the tincture from one to four fluidrachms; of the extract, which is the best form of administration, from five to fifteen grains.

TRITICUM HYBERNUM.

Wheat.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Triandria Digynia.

FLOUR OF THE SEEDS.

Description.—This plant, the common Winter Wheat, described as *T. Sativum*, and *T. Vulgare*, has a fibrous *root*, and a round, smooth, straight *stem*, from three to four feet, or more in height, the internodes being somewhat inflated. The *leaves* are lance-linear, veined, roughish above, with truncate and bristly stipules. The *flowers* are on a four-cornered, imbricated, terminal *spike*, two or three inches in length, with a tough *rachis. Spikelets* crowded, broad-ovate, about four-flowered; *glumes* ventricose, ovate, truncate, mucronate, compressed below the apex, round and convex at the back, with a prominent nervure. *Paleæ of the upper florets* somewhat bearded. *Grains* loose.—*W.*—*L.*—*Wi.*

History.—Several species of Triticum are cultivated in different countries, among which may be named the *T. Vulgare*, the species most generally raised in this country and Europe. It has two varieties, *T. Vulgare Æstivum* or Spring-Wheat, and *T. Vulgare Hybernum*, or Winter-Wheat. Linnæus considered these as distinct species, but botanists of the present day generally refer them to one common stock. Barley and oats have the perianth attached to the grain, which is not the case with Wheat. Wheat is supposed to be a native of Central Asia, in the country of the Baschkirs. The officinal part is the seeds, deprived of their husk, and ground to a fine flour. Wheat is liable to the following diseases, from parasitical fungi, viz.: 1. *Bunt*, *smut-balls*, or *pepper-brand*, produced by *Uredo Caries*, and giving a disgusting odor to the flour. This fungous plant is also called *Tilletia Caries*, and infests corn grains and other grasses. 2. *Smut*, *dust brand*, or *burnt ear*, produced by *Uredo Segetum* or *Ustilago Carbo*. 3. *Rust*, *red-rag*, *red-robin*, or *red-gum*, caused by the young state of *Puccinia Graminis*. 4. *Mildew*, produced by the more advanced growth of *P. Graminis*. 5. *Ergot*, caused by the *Oidium abortifaciens* or *Claviceps purpurea*, and which is as powerful in its action on the uterus as ergot of rye. Two diseases of Wheat are produced by parasitical animalcules, viz.: 1. *Ear-cockle*, *purples*, or *pepper corn*, caused by a microscopic, eel-shaped animalcule, called *Vibrio Tritici*, or *Anguillula Tritici*. 2. *Wheat-midge*, an abortion of the grains caused by a minute two-winged fly called *Cecidomyia Tritici.*—*P.*

Good Wheat flour is very white, has a faint peculiar odor, and is nearly tasteless. According to Vauquelin it consists of starch, gluten, sugar, gum, bran and water. Payen found starch from 58 to 73 parts; gluten, and other azotized matters, from 11 to 22; dextrine, glucose, or congenerous substances, from 6 to 9; fatty matters, 1.87 to 2.61; cellulose, 3 to 4; silica, phosphates of lime, magnesia and soluble salts of potassa and of soda 2.12 to 3.02. According to Mr. Johnston the composition of Wheat-bran is subject to great variation; the following is the average: Water 13.1, coagulated albumen 19.3, oil 4.7, husk and a little starch 55.6, saline matter (ash) 7.3. The proportion of these constituents in Wheat grains varies according to climate, soil, mode of culture, quality of manure, time of cutting, etc. The starch which constitute at least one-half of Wheat grains, is of finer quality, and of greater density than that obtained from most other sources. (*See Amylum*). The gluten of Wheat is usually assumed as the most perfect form of that principle, and is more abundant in Wheat than in any other kind of grain, rendering Wheat flour superior to any other for the manufacture of bread. If Wheat flour be kneaded into a paste with a little water, it forms a tenacious, elastic, soft, ductile mass. This is to be washed cautiously, by kneading it under a small stream of water till the water no longer carries off any thing, but runs off colorless; what remains behind is *gluten*. It is of a gray color, exceedingly tenacious, ductile, and elastic, has a peculiar smell, and hardly any taste. On exposure to the air, it slowly dries, forming a hard, brittle, slightly transparent, dark-brown substance, resembling glue, which breaks like glass, with a vitreous fracture, imbibes water, but loses its tenacity and elasticity by boiling. It decomposes rapidly in a moist atmosphere, emitting a very offensive odor. Gluten has been resolved into vegetable fibrin, glutin or pure gluten, mucin or vegetable caseine, and oil.

The milky liquid produced by washing the Wheat flour, as above named, contains in solution, gum, sugar, and vegetable albumen. *Vegetable albumen* may be obtained by allowing this fluid to deposit its starch, pouring off the supernatant liquor, and heating it to nearly boiling, 140° to 160°; flakes of coagulated albumen are formed. Vegetable albumen is soluble in water, but when coagulated by heat it is insoluble; it is also insoluble in alcohol and ether. When dry it is opaque, white, gray, brown, or black according to circumstances, and is not adhesive like gum. Solutions of caustic alkalies readily dissolve it, and an excess of acid throws down a precipitate composed of the acid and albumen; this precipitate is but little soluble in water, and is precipitated from it again by acids, prussiate of potash, corrosive sublimate, and infusion of nut-galls. It is not soluble in the alkaline carbonates, nor in caustic ammonia after having been coagulated. Carbonate of ammonia is its best precipitant from an acid solution, throwing it down in white flocks. The solution of albumen in caustic potassa, forms an insoluble precipitate with earthy or metallic salts, which is a compound of the albumen and the base of the salt. A salt of peroxide of iron produces thus a deep-red precipitate; of protoxide, a white precipitate, which by exposure to the air becomes yellow; the salts of copper give a pale bluish-green precipitate.—*T.* Vegetable albumen possesses nearly all the characters of animal albumen, and is considered identical in composition with it. Dr. Bence Jones found it to be composed of carbon 55.01, hydrogen 7.23, nitrogen 15.92, oxygen, sulphur, and phosphorus 21.84.

Vegetable fibrin is the essential part of what is called the gluten of Wheat. When Wheat, softened in water is kneaded and washed as above stated, to remove the starch, sugar, etc., and the residuary mass is beat up with rods, the pure fibrin adheres in elastic, transparent filaments to the rods. These, after being treated by ether, to remove fat oil, are pure fibrin. When dried, it becomes grayish and translucent, like horn. When heated, it yields the usual products of animal matters; and when left to itself, in the moist state, it putrefies, disengaging fetid gases. It is quite insoluble in water. Diluted phosphoric and acetic acids dissolve it easily; these solutions are precipitated by ferrocyanide of potassium, and by infusion of galls. Dilute potassa also dissolves it; and this solution, when neutralized by phosphoric or acetic acid, yields a precipitate which dissolves in an excess of either of these acids. Dr. Bence Jones found it to consist of carbon 52.22, hydrogen 7.42, nitrogen 15.98, oxygen, etc., 21.38.

Glutin or *pure gluten* is obtained by boiling crude gluten in alcohol, which dissolves glutin, caseine, and oil. On cooling the caseine is deposited. The supernatant liquid on being evaporated to dryness, yields an adhesive mass, from which the oil may be removed by ether; the residue is gluten. Its composition according to Mulder is $10\ (C_{40}\ H_{31}\ N_5\ O_{12}) + S_2$. It is dissolved by alkalies and acids, the hydrochloric acid forming a blue solution. Its solution in acetic acid is precipitated by chloride of mercury and infusion of galls, but the acetate of lead, and persulphate of iron does not affect it. It differs from casein and albumen by its solubility in alcohol.

It is through the presence of gluten, that flour can be made into bread. The small quantity of yeast added, causes vinous fermentation, with evolution of carbonic acid gas which expands the gluten into vesicles, and gives to the baked bread its light spongy character.

Wheat is not much subject to adulterations in this country; the most we have to fear is diseased Wheat, but an examination under the microscope, will at once detect parasitical growths, or their spores, etc. Good Wheat in a cold decoction is rendered blue by the tincture of iodine; good Wheat flour is colored orange-yellow by nitric acid; and blue by recently made tincture of guaiacum.

Properties and Uses.—Wheat is very nutritive, when made into bread or cakes and baked. Toasted-bread infused in water, forms an agreeable and lightly nourishing drink for invalids, especially those suffering from febrile or inflammatory attacks. It may be sweetened with loaf-sugar, or a little molasses, and flavored, if desired with strawberry-juice, raspberry-juice, lemon-juice, etc., or the syrups of these fruits may be added to flavor it. Wheat flour is occasionally used to lessen the itching and burning sensations produced by urticaria, scalds, burns, erysipelas, etc.; rye-flour, however, is considered to act more efficiently; it is to be dusted upon the affected parts. It cools the part, excludes the air, and absorbs any discharges present, forming with them a crust which effectually protects the part underneath. When bread is soaked in milk, boiling hot, it forms the emollient bread and milk poultice; a small quantity of sweet lard or olive oil added, improves it; yeast, with or without charcoal, mixed with this, forms an excellent antiseptic poultice; or, if powdered mustard be added, a sinapism is formed. When a bread poultice is applied to inflamed parts, the addition of a solution of borax, will frequently facilitate its action. When it is desired to administer very small doses of remedial agents, this may be accomplished by mixing them with the crumb of bread, *mica panis*, in pill form. But nitrate of silver if used thus, will be converted into a chloride, by the reaction existing between it and the salt in the bread. Wheat flour lightly baked, so as to acquire a pale buff tint, forms an excellent food for infants, invalids, and convalescents; it may be boiled with milk or milk and water, and lightly salted or sweetened as desired.

Bran, *Furfures Tritici*, in decoction or infusion is sometimes employed as an emollient foot-bath; it is also taken internally as a demulcent in catarrhal affections. Its continued use causes a relaxed condition of the bowels. Bran poultices are sometimes used, warm, in abdominal inflammations, spasms, etc. Bread made from unsifted flour has been found beneficial in indigestion and constipation. The following forms a good bread for patients laboring under diabetes. Wash coarse Wheat bran thoroughly with water on a sieve until the water passes through clear; dry this in an oven, grind it to a fine powder, and to seven eggs, one pint of milk, one-fourth pound of butter, and a little ginger, add enough of the bran flour to make a paste; divide into seven equal parts, and bake in a quick oven, say from twenty to twenty-five minutes.—*P.*

I am indebted to Prof. T. J. Wright, of Cincinnati, for the following remarks on Wheat, the correctness of which have been corroborated by other physicians who have made use of it according to his method. His mode of preparing and using it is as follows:

"The seeds of Wheat should be well cleaned before cooking them, in the following manner: Take of the seeds of Wheat a sufficient quantity, and place them in clear, cold water, stir it, and skim off the light grains which rise to the surface in connection with foreign substances; then change the water, stir the grain, and skim as before, and thus continue till the Wheat is perfectly clean, and all the light grains and extraneous substances are removed. To the Wheat thus cleansed, add a sufficient quantity of water to cover it, and allow it to stand for twelve hours, or until the next morning, if this is done at night; then pour off the liquid, and add of some clean water a sufficient quantity, and boil for from two to four hours, or until the spermoderm is cracked, when remove the Wheat from the water, let it cool, and it is ready for use. Of this prepared Wheat, small quantities ought to be made at a time, especially in warm weather, as it is apt to become sour; enough for one or two days at the most, is sufficient, and it should always be kept in a cool place.

"There are several ways in which this preparation can be be used, viz.: It may be eaten with molasses or sugar, as boiled rice is sometimes eaten; or it may be made into a frumenty, by boiling a sufficient quantity of milk, and thickening it with flour to the consistence of gruel; remove from the fire, add as much prepared Wheat as desired, and sweeten. But the preparation which I prefer, is to use water instead of milk, and thicken with Indian meal to the consistence of gruel, then remove from the fire, add prepared Wheat in quantity to suit the patient and sweeten. Wheat thus prepared, undoubtedly acts mechanically, owing to the action of the coarse particles upon the intestinal mucous lining membrane, which maintain the peristaltic motion and keep the bowels in a soluble condition; and in addition to its nutritive qualities, prepared Wheat is one of the most valuable articles of diet for patients, and may be used either in a loose or torpid state of the bowels. In dyspepsia, fistula in ano, hemorrhoids, constipation, as well as the opposite condition, the employment of it is not only beneficial, but materially assists in their cure. I have extensively used the above in obstinate constipation, chronic diarrhea, and other diseases, with decided advantage in every case, and can, therefore, confidently recommend it to my medical brethren."

TUSSILAGO FARFARA.

Coltsfoot.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Superflua.

THE LEAVES.

Description. — Coltsfoot has a long, perennial, creeping, horizontal *rhizoma*, with many fibers. The *leaves* are radical, erect, on furrowed, channeled footstalks, heart-shaped, slightly lobed, copiously and sharply toothed, very smooth, of a slightly glaucous green above, pure white and densely cottony with prominent veins beneath; when young they are revolute and thickly enveloped in cottony down. They do not appear until after the flowers are withered; they are from five to eight inches long, by from three to six broad. The *flowers* are large, bright-yellow, compound; *heads* drooping in the bud, about an inch broad; *rays* spreading, copious, very narrow. Each flower-head on a simple, round, woolly *scape*, about five inches high, scaly with numerous, reddish, smooth, scattered bracts, crowded under the head like an exterior involucre. *Receptacle* naked. *Anthers* scarcely tailed; *styles of the disk* inclosed, abortive; *of the ray* bifid, with taper arms. *Achenium of the ray* oblong-cylindrical;

of the disk abortive. *Pappus of the ray* in many rows; *of the disk* in one row, consisting of very fine setæ.—*L.*

History.—This plant grows in Europe, the Crimea, Persia, Siberia, and the East Indies, from the sea-shore to elevations of nearly eight thousand feet; it also grows in this country in wet places, on the sides of brooks, flowering in March and April. Its presence is a certain indication of a clayey soil.—*W.* The flowers are rather fragrant, and continue so after having been carefully dried. The leaves are the parts used, though all parts of the plant are active, and should always be employed, especially the leaves, flowers and root. The *leaves* should be collected at about the period they have nearly reached their full size; the *flowers* as soon as they commence opening; and the *root* immediately after the maturity of the leaves. When dried, all parts have a bitter, mucilaginous taste, and yield their properties to water or diluted alcohol. Sesquichloride of iron renders the infusion green. It appears to contain mucilage, bitter extractive, tannic acid, coloring matter, salts, and lignin; but no definite analysis has been made.

Properties and Uses.—Coltsfoot may be regarded as emollient, demulcent, and slightly tonic.—*P.* The decoction is usually administered in doses of from one to three or four fluidounces, and has been found useful in coughs, asthma, hooping-cough, and other pulmonary affections; and is said to have been useful in scrofula. The powdered leaves form a good errhine, for giddiness, headache, nasal obstructions, etc. Used externally in form of poultice to scrofulous tumors.

TYPHA LATIFOLIA.

Cat-tail Flag.

Nat. Ord.—Typhaceæ. *Sex. Syst.*—Monœcia Triandria.

THE ROOT.

Description.—Cat-tail Flag, or *Reed Mace*, as it is sometimes called, is a perennial plant, with a smooth, round *stem*, from three to five feet high, leafy below, and terminated by large cylindric spikes. The *leaves* are flat, erect, ensiform, slightly concave within near the base, from two to four feet long, and nearly one inch wide. The *flowers* are very numerous. The *spikes* are of a brownish color, from six to ten inches in length, and about one inch in diameter, and are composed of slender, downy flowers, so compact, particularly the fertile ones, as to be of considerable hardness. The upper portion is smaller, and composed of the sterile flowers, so that the staminate and pistillate parts of the spike approximate, or are almost continuous.—*W.*—*G.*

History.—This plant is common to all parts of the United States, and is found growing in ditches, muddy pools, borders of ponds, and other wet places, flowering in July. The leaves are called Flags, and are used for weaving the seats of chairs; the flowers have been used for making beds. The root is the part used; it yields its properties to water.

Properties and Uses.—Astringent and emollient. Boiled with milk, it has been found useful in dysentery, diarrhea, and infantile summer-complaint, and a decoction of it has been beneficial in gonorrhea. Externally, the root, in combination with elm and aromatics, forms an excellent poultice for white swellings, tumors, and ulcers. The root, bruised until it becomes like a jelly, forms an excellent application for burns and scalds. erysipelas, ophthalmia, and all local inflammations.

ULMUS FULVA.

Slippery-elm.

Nat. Ord.—Ulmaceæ. *Sex. Syst.*—Pentandria Digynia.

THE INNER BARK.

Description.—Slippery-elm, also called *Red Elm*, is a tree from twenty to sixty feet in height and one or two feet in diameter. The *bark* is brownish, that of the branches whitish and scabrous. The *leaves* are from four to six inches long, and two or three inches broad, lanceolate-oval, or obovate-oblong, conspicuously acuminate, doubly serrate, the upper surface scabrous, beneath tomentose-pubescent, and standing on downy footstalks about four lines long. The *buds* are rusty-woolly. The *flowers* are sessile, in dense lateral clusters, and appear before the leaves. *Calyx* about seven-lobed, campanulate, downy; *corolla* none; *stamens* five or seven, short, reddish. The *fruit* is an orbicular samara, compressed, with a broad, membranaceous border, not fringed, and about six lines in diameter; *seeds* one, round.—*W.*—*G.*—*Darlington.*

History.—The Slippery-elm tree is a large tree common to this country, especially the Western States; it grows in woods and low grounds, along fences, and in rich, dry or moist soils, flowering in April. The officinal part is the inner bark, which is generally separated from the tree in long strips. It is met with in the shops in flat fragments, of various lengths, about two or three lines thick, of a yellowish-white color on its external surface, and slightly tinged with red on its inner; its odor is characteristic and by no means disagreeable, and its taste is purely mucilaginous. It is also met with in the form of a ragged, fibrous mass, and in very fine powder of a whitish-yellow color, which is obtained by grinding the bark. Slippery-elm bark consists principally of mucilage and woody fiber; water takes up its mucilage, from which it is precipitated by the acetates of lead.

Properties and Uses.—Elm bark is nutritive, expectorant, diuretic, demulcent, and emollient, and is a very valuable remedial agent. In mucous inflammations of the lungs, bowels, stomach, bladder or kidneys, used freely in the form of a mucilaginous drink, it is highly beneficial, as well as in diarrhea, dysentery, coughs, pleurisy, strangury, and sore-throat, in all of which it tends powerfully to allay the inflammation. A tablespoonful of the powder boiled in a pint of new milk affords a nourishing diet for infants weaned from the breast, preventing the bowel complaints to which they are subject, and rendering them fat and healthy. Some physicians consider the constant use of it, during and after the seventh month of gestation, as advantageous in facilitating and causing an easy delivery; a half pint of the infusion to be drank daily. Elm bark has likewise been successfully employed externally in cutaneous diseases, especially in obstinate cases of herpetic and syphilitic eruptions, and certainly possesses more efficient virtues than are commonly supposed. As an emollient poultice, the bark has been found very serviceable when applied to inflamed parts, suppurating tumors, fresh wounds, burns, scalds, bruises, and ulcers; and in the excruciating pains of the testes which accompany the metastatis of cynanche parotidæa, whether of recent or long standing, the constant use of an Elm poultice regularly changed every four hours will be found a superior remedy. Notwithstanding its general value as an application to ulcers, it will often be found injurious, especially when used as a cataplasm to ulcers of the limbs, rendering the ulcer more irritable and difficult to heal, and frequently converting a simple sore, which might be cured by astringent or other washes, into an almost intractable ulcer; much care, is therefore required, in the application of this bark externally. As an injection, the infusion will prove useful in diarrhea, dysentery, tenesmus, and hemorrhoids, also in gonorrhea and gleet. The powder, sprinkled on the surface of the body, will prevent and heal excoriations and chafings, and allay the itching and heat of erysipelas. As the bark increases in bulk by imbibing moisture, it has been recommended to form bougies and tents of it for the dilatation of strictures, fistulas, etc., but in urethral strictures it has proved troublesome, from liability of the part behind the stricture, breaking off in the attempt to withdraw it, and passing into the bladder. The infusion of the bark is the common form of administration, and may be drank *ad libitum*.

Off. Prep—Cataplasma Ulmi; Infusum Ulmi.

URTICA DIOICA.

Common Nettle.

Nat. Ord.—Urticaceæ. *Sex. Syst.*—Monœcia Tetrandria.

THE ROOT AND LEAVES.

Description.—This plant, also called *great Stinging Nettle*, is a perennial, herbaceous, dull-green plant, armed with minute rigid hairs or prickles, which transmit a venomous fluid when pressed. The *stem* is obtusely four-angled, branching, and from two to four feet high, and arises from a creeping and branching *root*, with fleshy shoots and many fibers. The leaves are opposite, petiolate, cordate, lance-ovate, spreading, conspicuously acuminate, coarsely and acutely serrate, the point entire, armed with stings, three or four inches long, and about half as wide. The *wers* are small, green, monœcious or diœcious, in branching, clustered, axillary, interrupted *spikes*, longer than the petioles.—*W.*—*L.*

History.—This is a well known plant, common to Europe and the United States, growing in waste places, by wood-sides, in hedges, and in gardens, flowering from June to September. A decoction of the plant strongly salted, will quickly coagulate milk without imparting to it any unpleasant flavor. The leaves and root are generally used, and yield their virtues to water. No analysis has been made of the plant. The young shoots have been boiled and eaten as a remedy for scurvy. The irritation caused by rubbing the sharp hairs of the Nettle on the skin, is said to be caused by the free formic acid which they contain.—*Am. Jour. Pharm. XXVI.*, 181.

Properties and Uses.—Common Nettle is astringent, tonic, and diuretic. A decoction is valuable in diarrhea, dysentery, hemorrhoids, various hemorrhages, and scorbutic affections, and has been recommended in febrile affections, gravel, and other nephritic complaints. A strong syrup made of the root, combined with suitable quantities of wild-cherry bark and blackberry root, forms an excellent remedy for all summer complaints of children, and bowel affections of adults. The leaves of the fresh plant stimulate, inflame, and even raise blisters on those portions of the skin with which they come in contact, and have, in consequence, been used as a powerful rubefacient. Paralysis is said to have been cured by whipping the affected limbs with them. Applied to bleeding surfaces they are an excellent styptic. The seeds and flowers, given in wine, in doses not to exceed one drachm, have been reputed equal to cinchona in tertian and quartan agues—larger doses will, it is said, induce a lethargic sleep. The seeds, in doses of fourteen or sixteen seeds, and repeated three times daily, are highly recommended as a remedy for goître, and to reduce excessive corpulence ; they are also considered anthelmintic. Dose of the powdered root or leaves from twenty to forty grains ; of the decoction from two to four fluidounces.

Urtica Urens, or Dwarf Nettle, possesses similar properties, and has been found very efficacious in uterine hemorrhage. It has a branching, hispid, stinging *stem*, one or two feet high, with broadly elliptic, acutely serrate *leaves*, about five-veined, on short petioles, one or two inches long, and about two-thirds as broad. The *flowers* are in drooping, pedunculate, nearly simple clusters, two in each axil, and shorter than the petioles. This is an annual, introduced from Europe.—*W.*

Urtica Pumila, Cool-weed, Rich-weed, or Stingless Nettle, has a peculiar, grateful, strong smell, indicating active properties ; it is stated that the leaves bruised give immediate relief in inflammations, painful swellings, ecchymoses, erysipelas, and the topical poison of rhus ; and that an ointment made from it is beneficial in inflammatory rheumatism. It is the *Pilea Pumila* of Lindley, and has a smooth, shining, ascending, weak and succulent, often branched, and translucent *stem*, from four to eighteen inches high, and, together with the whole plant, destitute of stings. The *leaves* are on long petioles, opposite, rhombic-ovate, crenate-serrate, membranaceous, glabrous, pointed, three-nerved, about two inches long, and two-thirds as broad. The *flowers* are monœcious, triandrous, in axillary, corymbed heads shorter than the petioles. *Sepals* of the fertile flowers lanceolate, and a little unequal. This plant is worthy of further investigation.—*W.*

UVARIA TRILOBA.

Papaw.

Nat. Ord.—Anonaceæ. *Sex. Syst.*—Polyandria Polygynia.

THE SEEDS.

Description.—This is the *Porcelia Triloba* of Michaux, and the *Asimina Triloba* of Adamson; it is a small and beautiful indigenous tree, growing from ten to twenty feet high. The young shoots and expanding leaves clothed with a rusty down, soon glabrous. The *leaves* are thin, smooth, entire, ovate-oblong, acuminate, from eight to twelve inches long, by three or four broad, and tapering to very short petioles. The *flowers* are dull purple, axillary and solitary; the *petals* veiny, round-ovate, the outer ones orbicular and three or four times as large as the calyx. The flowers appear with the leaves, and are about an inch and a half wide. The *fruit* is a yellowish, ovoid-oblong, pulpy pod, two or three inches long by about an inch in diameter, fragrant, sweet and edible in autumn, and containing about eight seeds.—*W.*—*G.*

History.—The Papaw or Custard Apple-tree is an inhabitant of the Middle, Southern, and Western States, growing in rich soil, and on the banks of streams, and flowering from March to June. The fruit is large and fleshy, and has an unpleasant smell, but when ripe and after frost, the pulp is sweet, luscious, and yellow, similar to custard; it is considered a healthy fruit, and is sedative and laxative. The seeds, which are the parts used, have a fetid smell, similar to stramonium; they are covered with a tough, hard, exterior coat, of a light-brownish color and smooth externally, lighter and wrinkled internally, inclosing a kernel of a whitish-yellow color, compressed, deeply fissured on both sides, nearly inodorous, very faintly bitter and sweetish, and dry and branny when chewed, leaving a very persistent, faint, but rather unpleasant sensation of nausea. They are of various shapes, being flat, ovoid, nearly circular, or somewhat reniform, with a longitudinal furrow or depression along the center of each of the flat surfaces, and frequently a ridge or elevation instead of the furrow. They yield their properties to alcohol.

Properties and Uses.—Emetic; for which purpose a saturated tincture of the bruised seeds is employed, in doses of from ten to sixty drops. The bark is said to be a bitter tonic, and has been used as such in domestic practice. The medical properties of this agent have not been fully investigated.

UVULARIA PERFOLIATA.

Bellwort.

Nat. Ord.—Liliaceæ. *Sex. Syst.*—Hexandria Monogynia.

THE ROOT.

Description.—Bellwort has a perennial, creeping rootstock, and a *stem* from eight to fourteen inches high, dividing at top into two branches. The *leaves* are clasping-perfoliate, elliptical, rounded at base, acute at apex, two or three inches long by one-third as broad, smooth, glaucous underneath. The *flowers* are solitary, pale-yellow, about an inch long, and pendulous from the end of one of the branches; *perianth* subcampanulate, tuberculate-scabrous within; *segments* linear-lanceolate, about an inch long, twisted; *anthers* cuspidate, three-fourths of an inch long. *Capsule* or *pod* obovate-truncate, divergently three-lobed at top; lobes with convex sides.—*W.*—*G.*

History.—Bellwort is a smooth, handsome plant common to the United States, growing in moist copses, woods, etc., and flowering in May. The root is the part employed, which, when recent, is acrid and mucilaginous. It imparts its properties to water.

Properties and Uses.—Bellwort is tonic, demulcent, and nervine, and may be used in decoction or powder, as a substitute for cypripedium. The decoction has proved beneficial in sore mouth and affections of the throat, also inflammation of the gums. A poultice of it is useful in wounds and ulcers. Boiled in milk, and the decoction drank freely, with a poultice of the root applied to the wound, it has considerable reputation as an alexipharmic in the bites of venomous snakes. A poultice of the green or dried root, in powder, and mixed with hot new milk, is very highly recommended in all stages of erysipelatous inflammation, to be renewed when dry; the same application has been used beneficially in acute ophthalmia. An ointment made by simmering the powdered roots and green tops in lard, for an hour, over a slow fire, and straining by pressure, is useful in herpetic affections, sore ears, mouths, etc., of children, and also in mild cases of erysipelas.

VACCINIUM FRONDOSUM.

Blue Whortleberry.

Nat. Ord.—Ericaceæ. *Sex. Syst.*—Decandria Monogynia.

THE FRUIT.

Description.—This is a shrub from three to six feet high, with a grayish bark, and round, smooth, slender and divergent branches. The *leaves* are deciduous, obovate-oblong, obtuse, entire, pale, glaucous beneath, and covered with minute resinous dots, the margin being slightly revolute. The *flowers* are small, nearly globose, reddish-white, and arranged in loose, slender, lateral, bracteate racemes; *bracts* oblong or linear, rather deciduous, shorter than the pedicels; *pedicels* from five to ten lines long, slender, drooping, bracteate near the middle. *Corolla* ovoid-campanulate, with acute divisions, and inclosing the stamens. *Fruit* large, globose, dark-blue, covered with a glaucous bloom, sweet and edible.— *W.*

VACCINIUM RESINOSUM, *Black Whortleberry* or *Huckleberry*, is a bushy shrub from one to three feet in height. The *branches* are cinerous-brown, and villose when young. The *leaves* are deciduous, oblong-ovate, or oblong-lanceolate, rather obtuse, entire, petiolate, one or two inches long, and about one-third as wide, thickly covered with shining resinous dots beneath. The *flowers* are reddish, tinged with green, or yellowish-purple, and disposed in lateral, secund, dense, corymbose racemes, small and drooping; *pedicels* about the length of the flowers, sub-bracteolate; *bracts* and *bractlets* reddish, small, and deciduous. The *corolla* is ovoid-conic, at length subcampanulate, five-angled, contracted at the mouth, and longer than the stamens, but shorter than the style. *Fruit* globose, black, without bloom, sweet and edible.— *W.*

History.—These plants are common to the Northern States, growing in woods and pastures, flowering in May and June, and ripening their fruit in August. The fruit, or berries, together with the bark of the root are the parts used. They yield their virtues to water.

The different varieties of Whortleberry possess similar properties, as the *V. Dumosum*, or Bush-Whortleberry, *V. Corymbosum*, or Giant-Whortleberry, *V. Pennsylvanicum*, or Black-blue-Whortleberry, *V. Vitis Idœa*, or Bilberry, and several others. Several species are found growing in the mountainous regions of some of the Southern States. Torrey and Gray have removed the *V. Frondosum*, *V. Resinosum*, and *V. Dumosum*, from the genus *Vaccinium*, and placed them in a new one called *Gaylussacia*, in honor of the distinguished chemist, Gay-Lussac.

Properties and Uses.—Diuretic and astringent. The fruit is very useful, eaten alone, with milk or sugar, in scurvy, dysentery, and derangements of the urinary organs. The berries and roots, bruised and steeped in gin, form an excellent diuretic, which has proved of much benefit in dropsy and gravel. A decoction of the leaves or bark of the root is astringent, and may be used in diarrhea, or as a local application to ulcers, leucorrhea, and ulcerations of the mouth and throat. Both the berries and root-bark of *V. Arboreum*, or farkleberry, are very astringent, more so than the other varieties above-named, and may be used in all cases where this class of agents is indicated, as in diarrhea, chronic dysentery, etc., taken internally; and the infusion will be found valuable as a local application in sore throat, aphthous ulcerations, some forms of chronic ophthalmia, leucorrhea, etc.

VALERIANA OFFICINALIS.

Valerian.

Nat. Ord.—Valerianaceæ. *Sex. Syst.*—Triandria Monogynia.

THE ROOT.

Description.—The officinal Valerian, sometimes known as *Great Wild Valerian*, is a large herb, with a perennial tuberous, somewhat creeping, fetid *root*, most aromatic when growing in dry pastures, with numerous long, dark-brown rootlets, and a smooth, hollow, furrowed *stem* about four feet in height. The *leaves* are all pinnate, opposite; the *leaflets* are in from seven to ten pairs, lanceolate, coarsely serrated, those of the radical leaves broadest, approaching to ovate, and on long footstalks. The *flowers* are flesh-colored, small, fragrant, and arranged in terminal cymose, contracted panicles. *Bracts* ovate-lanceolate, acuminate, herbaceous, membranous at the edge, appressed, rather longer than the ovary. The *calyx* is superior, rolled inward in the form of a rounded thickened rim, ultimately becoming a sort of pappus to the seed. The *corolla* is funnel-shaped and smooth; the *tube* gibbous at the base on that side of the flower turned away from the axis, hairy internally; *limb* spreading, divided into five nearly equal, concave, linear, rounded segments. The *stamens* are three, exserted, subulate, white, from the middle of the corolla-tube; *anthers* yellow, oblong. The *ovary* is inferior, narrow-oblong, compressed, one-celled, with a single pendulous ovule; *style* filiform; *stigma* divided into three filiform lobes. *Fruit* light-brown, linear-ovate, compressed, with a slightly elevated ridge on one side, terminated by the twelve filiform, plumose, recurved segments of the calyx-limb.—*L.*—*Wo.*

History.—Valerian is a European plant growing in wet places, or even in dry pastures, flowering in June and July. Several varieties of Valerian grow in this country. The medicinal part of the plant is the root, which consists of a short tuberculated underground stem or rhizome, from which issues one or more creeping shoots or stoles, and numerous round tapering root-fibers, from two to six inches long; whitish internally, and, when fresh, grayish or yellowish; white externally, but when dried, yellowish-brown. They give origin to fibrillæ or rootlets. The taste of the root is warm, camphoraceous, slightly bitter, somewhat acrid, and nauseous. The odor of the fresh roots is not very considerable, but of the dry, especially when they have been kept for some time, much stronger; it is fetid, characteristic, and highly attractive to cats, and, it is said, to rats also.—*P.* It should be gathered soon after the leaves have fallen, and carefully dried. It imparts its properties readily to water, alcohol, and ammoniated alcohol. The Valerian imported from England is the best. Trommsdorff found Valerian to contain a peculiar volatile oil combined with valerianic acid, starch, albumen, peculiar extractive matter (*Valerianin*), yellow extractive matter, soft or balsamic resin, mucilage, valerianate of potassa, malates of potassa and lime, sulphate and phosphate of lime, silica, and woody fiber.—*P.* The root depends chiefly upon the volatile oil for its medicinal powers, which does not exist ready formed, but is produced only by the action of water, during distillation; the oil passes over with the aqueous vapor, and floats on its surface in the receiver. Pure Valerian oil is neutral, clear, and with a rather agreeable odor; by the action of the air it resinifies, becomes yellowish, thick, of a disagreeable odor, and valerianic acid is formed. This acid may also be obtained by the action of caustic potassa on the oil of potato-spirit. M. J. Lefort obtained the acid in large quantity, by placing in a retort 100 parts of water, two of sulphuric acid, one and one-fifth of bichromate of potassa, and twenty of the powdered root, and then distilling. Chiozza has obtained anhydrous valerianic acid thus—when oxychloride of phosphorus, $P\ Cl_3\ O_2$, is brought into contact with valerianate of potassa, a violent reaction takes place, and the odor of the oxychloride disappears. By treating the mass with a weak solution of carbonate of potassa, and then with ether, and evaporating the ethereal solution, the anhydrous acid is obtained.—*Am. Jour. Science and Arts, March,* 1853. Gruneberg recommends the following: Take $2\frac{3}{4}$ lbs. of bichromate of potassa, introduce it into a retort, and pour $4\frac{1}{2}$ lbs. of hot water upon it. A cooled mixture of 1 lb. of fusel oil and 4 lbs. of sulphuric acid diluted with 2 lbs. of water is to be allowed to flow very slowly and in a thin stream into the liquid in the retort, and the whole is then to be distilled. The distillation goes on quietly, and nine ounces of oily valerianic acid are obtained.

M. O.'Reveil has detected the roots of *Scabiosa Succisa* and *S. Arvensis* to the extent of 22 per cent. in some Valerian. The caudex of the scabious is shorter, truncated at its base; the radicles a little larger and smoother, having but little evidence of longitudinal striæ, are very fragile, fracturing with great facility, presenting a whitish amylaceous surface. These roots are inodorous, but soon acquire the odor of Valerian by association.—*Am. Jour. Pharm., XXVII.,* 21.

Properties and Uses.—Valerian excites the cerebro-spinal system. Large doses cause headache, mental excitement, visual illusions, giddiness, restlessness, agitation, and even spasmodic movements, and frequently nausea. In medicinal doses it acts as a stimulant-tonic, antispasmodic, and calmative, and has been used in chorea, epilepsy, hysteria, and in the low forms of fever where a nervous stimulant is required. Although sometimes very effectual in curing, it as frequently fails in producing more than temporary benefit. The extract is worthless, but the fluid extract has been found to possess all the medicinal virtues of the root. The powder is apt to irritate the stomach and bowels; its dose is from half a drachm to two drachms, every three or four hours; the infusion, which is a preferable form, may be given in doses of one or two fluidounces; the fluid extract in doses of from twenty to sixty drops in a little water; the tincture, in doses of one or two fluidrachms; and the volatile oil from two to six drops.

Off. Prep.—Acidum Valèrianicum; Extractum Valerianæ Fluidum; Infusum Valerianæ; Oleum Valerianæ; Pilulæ Valerianæ Compositæ; Tinctura Valerianæ; Tinctura Valerianæ Ammoniata.

VANILLA AROMATICA.

Vanilla.

Nat. Ord.—Vanillaceæ. *Sex. Syst.*—Gynandria Monandria.

THE FRUIT OR PODS.

Description.—Vanilla Aromatica is a shrubby, climbing, aerial parasite; it commences its growth in the crevices of rocks, or on the trunks of trees, suspending itself to contiguous objects, and finally becomes detached from its original support, being truly an aerial plant. Planted in the woods or in warm ravines, it grows rapidly, fastening upon the trees in its neighborhood, especially those whose barks are soft and spongy. The *stem* is round, about as thick as the finger, from twenty to thirty feet in length, and often smaller at the base than at the summit. The *leaves* are alternate, oblong, entire, on short petioles, glaucous, green, fleshy, and pointed by a species of abortive tendril, which is a continuation of the midrib; opposed to each leaf are one or two aerial roots, which attach themselves to surrounding objects. The *flowers* are axillary, paniculate, yellowish-white at base, and attended with one green bract; they expand one after another and endure only for a day. The *ovaries* appear at first view to be peduncles, they are erect after fecundation, and then become pendulous as they enlarge. The *fruit* is a silique or species of bean, yellow or buff color, of an agreeable aromatic odor, and filled with a pulpy matter containing acicular crystals of an impure benzoic acid. They must be dried with care or they lose their properties.

History.—Vanilla grows in Mexico and other parts of tropical South America. There are several species which are supposed to furnish the Vanilla of commerce, as *V. Planifolia*, *V. Sativa*, *V. Sylvestris*, *V. Guianensis*, *V. Palmarum*, and *V. Pompona.* The Vanilla is prepared differently in different places. In some places they dry the fruits in the sun, or by artificial heat, and then sweat them in blankets; in other places, they dip them in boiling water, hang them up to dry in the sun, and then oil them. These processes are said to not only preserve the fruits, but also to develop their odor, which is wanting in the recent state. There are several kinds of Vanilla to be met with, which consist of long, somewhat compressed pods, varying from two to eight inches in length, and from one-third to three-fourths of an inch in diameter. The best is of a dark shining brown color externally, tapering at the extremities, curved at the base, corrugated lengthwise, plump, heavy, pliant, soft, of a fine fragrant odor, and coated with brilliant acicular crystals. Sometimes dry, shriveled pods are freshened up with balsam of Peru, or are rolled in benzoic acid to give them a crystallized appearance. Bucholz found Vanilla to consist of an odorous, brownish-yellow fixed oil 10.8; soft resin, scarcely soluble in ether 2.3; bitter extractive with some acetate of potassa 16.8; acidulous, bitterish, astringent extractive 9.0; sweet extractive 1.2; saccharine matter with benzoic acid 6.1; gum 11.2; starchy matter 2.8; lignin 20.0; oxidized extractive dissolved by potassa 7.1; gum extracted by potassa 5.9; benzoic acid 1.1; water and loss 5.7. No oil is obtained from Vanilla by distillation with water, alcohol, or ether.—*P.* Vanilla yields its virtues to water or alcohol.

Properties and Uses.—Aromatic stimulant. Useful in infusion, in hysteria, rheumatism, and low forms of fever. It is also considered an aphrodisiac, powerfully exciting the generative system. Much used in perfumery, and to flavor tinctures, syrups, ointments, confectionary, ice-cream, etc. Dose of the powder, from eight to ten grains; of the infusion, made in the proportion of half an ounce to a pint of boiling water, half a fluidounce, three or four times a day. Vanilla is said to exhilarate the brain, prevent sleep, increase muscular energy, and stimulate the sexual propensities. To pulverize it, the pods must be cut in small pieces, mixed with sugar four parts, and pounded in an iron mortar, then sifted; the residue to be powdered with more sugar, and so on. Prof. W. Procter gives the following method for preparing a *Fluid Extract of Vanilla:* Cut choice Vanilla, one Troy ounce, in short transverse slices, beat it to a pulp with two ounces of sugar and a little deodorized alcohol, put the mixture in a small percolator, and pour gradually on, first deodorized alcohol four fluidounces, and afterward diluted alcohol, till twelve fluidounces of tincture are obtained. Add two ounces of sugar to this tincture, evaporate it at 120° F., till reduced to six fluidounces; then add ten ounces of sugar and five fluidounces of water, or as much as is sufficient to make the whole measure a pint. Thus made, Fluid Extract of Vanilla embodies all the aroma of the beans, and is well adapted for pharmaceutical and culinary purposes. (See Syrup Vanilla.)—*Am. Jour. Pharm., XXVI.*, 300.

VERATRUM ALBUM.

White Hellebore.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Polygamia Monœcia.

THE RHIZOMA.

Description.—By some botanists this plant is placed in the class and order of the Sexual System, *Hexandria Trigynia.* Veratrum Album is a perennial herb, with a fleshy, oblong, somewhat horizontal, premorse *rhizoma*, about the thickness of a finger, blackish, or brownish-white externally, whitish, or pale yellowish-white internally, and having numerous fleshy, brownish-white fibers or true roots. The *stem* is straight, round, striated, and from one to four feet high. The *leaves* are alternate, plaited, broad-ovate, acutish. The *flowers* are yellowish-white, green at the back, eight lines in diameter, and disposed in a terminal panicle; the *segments* spreading, serrulate, and somewhat wavy. In other respects it resembles the *Veratrum Viride.—L.*

History.—White Hellebore inhabits Europe, especially the Alpine and Pyrenneean districts. The part used is the rhizome or cormus, though the whole plant is highly noxious. The dried root, as found in the shops, consists of a single, double, or many-headed rhizoma, cylindrical, or in the form of a truncated cone, from two to four inches by one inch, rough, corrugated, grayish, or blackish-brown externally, having a faint, unpleasant odor, and a sweetish, bitter, and then intensely, disagreeably, and permanently acrid taste. Diluted alcohol is its best solvent. Its powder is somewhat of an ash-color. Pelletier and Caventou, who analyzed it in 1820, found it to contain fatty matter, composed of olein, stearin, and a volatile (cevadic?) acid, supergallate of Veratria, yellow coloring matter, starch, ligneous matter, and gum; the ashes contained much phosphate and carbonate of lime, carbonate of potassa, and some traces of silica, and sulphate of lime. Simon found a white, crystalline, fusible and inflammable substance in it, which he called *barytin;* its properties have not been thoroughly investigated. Veratria is the active medicinal principle of White Hellebore. (*See Veratria.*)

Properties and Uses.—White Hellebore is a violent irritant poison, occasioning when snuffed up into the nostrils, severe coryza, and when swallowed severe vomiting and profuse diarrhea. When it proves fatal, narcotic symptoms are superadded, such as stupor and convulsions. It was formerly administered as an emetic and purgative in insanity, as a diaphoretic in some diseases of the skin, and as a sternutatory, in combination with some other powder to modify its action, in headache, amaurosis, and ophthalmia.—*C.* At present, it is rarely used, except in the form of decoction or ointment, as an external application to kill lice, and cure the itch and some other cutaneous affections; but used thus it is not always free from danger. It has been used for the cure of gout, as a substitute for the *Eau Mèdicinale* of Husson; three parts of the wine of White Hellebore added to one part of laudanum, was given in doses of from half a fluidrachm to two fluidrachms. Poisoning by White Hellebore may be treated by coffee as a drink and in injection, with stimulants to overcome the depressed condition of the heart and arteries, and opiates and demulcents to relieve internal inflammation. Dose of the powder, from one to eight grains gradually and cautiously increased, commencing with one grain; of the vinous tincture, from twenty to sixty minims. Its use always requires great care.

Off. Prep.—Unguentum Sulphuris Compositum; Unguentum Veratri Albi.

VERATRUM SABADILLA.

Cevadilla.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Polygamia Monœcia.

THE SEEDS.

Description.—The precise origin of this remedy is yet involved in obscurity; by some, Cevadilla is referred entirely to the *Veratrum Officinale*, which has also been named *Helonias Officinalis*, and *Asagrœa Officinalis;* while others consider it the product of the *V. Sabadilla* and *A. Officinalis*, with other plants of allied species. More definite knowledge is required before its origin can be positively specified. The following is a description of two plants from which it is reputed to be obtained:—

VERATRUM SABADILLA of Retzius is a plant three or four feet high, with a simple, erect, round *scape*. The *leaves* are numerous, spreading on the ground, all radical, ovate-oblong, obtuse, with from eight to fourteen ribs, glaucous underneath. The *flowers* are blackish-purple, rather nodding, arranged on spreading, simple, or a little branched *panicles;* the *pedicels* are very short, approximated in twos and threes; those of the fertile flowers eventually becoming turned to one side; those of the sterile flowers deciduous, and leaving a scar. The *segments of the perianth* are ovate-lanceolate, and veinless. The *ovaries* are three, oblong, connate, obtuse; *styles* acute, dilated downward; *stigmas* simple. *Capsules* three, in form resembling those of Larkspur, occupying only one side of the stem, and opening at the apex inside. *Seeds* three in each cell, imbricated, curved, blunt on one side, sooty, acrid. This plant inhabits Mexico and the West-India Islands.—*L.*

ASAGRÆA OFFICINALIS, Lindley, *Veratrum Officinale*, Schlechtendahl, and *Helonias Officinalis* of Don, is a cæspitose plant, bulbous, with the *leaves* linear, tapering to a point, even, smooth, entire, channeled above, carinate at the back, about four feet long, by three lines broad. The *scape* is naked, the height of a man, quite simple, terminated by a raceme eighteen inches long. The *perianth* is deeply six-parted, spreading, yellowish-white, permanent, with linear, thick, veinless, obtuse *segments*, three of which are rather broader than the others. *Filaments* six, somewhat clavate, those opposite the broad segments of the perianth longer than the others, and all longer than the perianth. *Anthers* large, yellow, cordate, obtuse. *Ovary* formed of three cells, united by their sutures, with an obscure *stigma*. *Fruit* tricapsular; the carpels united by their suture separable. *Seeds* winged, wrinkled. Lower flowers hermaphrodite and fertile; upper male and sterile. This plant is a native of the eastern side of the Mexican Andes, near Barranca de Tioselo, by the Hacienda de la Laguna, in grassy places.—*L.*

History.—Cevadilla seeds are said to be brought from the Antilles, and are generally associated with the tri-follicled fruit, each division of which is composed of a slender, elastic, membranous follicle, and from one to three black, shining, flat, shriveled, winged, elastic seeds. The seeds are odorless, but have a bitter, acrid, tingling taste, which is intense, persistent and disagreeable; and their powder excites violent sneezing and discharge from the nostrils. They yield their properties with difficulty to water, but readily to alcohol. Meissner found them in 1819 to consist of various extractive matters, 25 per cent. of fixed oil, 10 of resin, a peculiar fatty acid, called Sabadillic or Cevadic acid (Pelletier and Caventou), various other unimportant constituents, and 0.6 of the alkaloid Veratria.—*C.* (*See Veratria*). M. Couerbe discovered both Sabadillia and Veratria in the seeds, the former of which has been considered by E. Simon as a double compound of resin and soda with resinous veratrine. Fr. Hübschmann has since obtained Sabadillia by treating this substance with ether, which dissolved the Veratria and left the Sabadillia. It is a white amorphous powder, does not cause sneezing like Veratria, is insoluble in ether, dissolves in 143 parts of cold water, which solution is not rendered turbid by ammonia, but is by carbonate of potassa, which precipitates about two-thirds of the alkaloid, and which, when heated, forms into a resinous mass.—*Am. Jour. Pharm. XXV.*, 133.

Properties and Uses.—Cevadilla seeds have been used as a vermifuge, and to destroy vermin in the hair, but their dangerous drastic and irritating properties have caused them to be dismissed from practice. They are principally used in the manufacture of Veratria; and rarely, but with great caution, in some nervous diseases, tape-worm, etc. The dose is from five to thirty grains, for the expulsion of tænia, and other worms. An extract has proved beneficial in painful rheumatic and neuralgic affections.

Off. Prep.—Veratria.

VERATRUM VIRIDE.

American Hellebore.

Nat. Ord.—Melanthaceæ. *Sex. Syst.*—Polygamia Monœcia.

THE RHIZOMA.

Description.—This plant, known also by the names of *Swamp Hellebore*, *Indian Poke*, and *Itch-weed*, has a perennial, thick and fleshy *rhizoma*, its upper portion tunicated, its lower half solid, and sending forth a multitude of large whitish roots. The *stem* is from three to five feet high, roundish, solid, striated, and pubescent, throughout the greater part of its length, closely invested with the sheathing bases of the leaves. *Lower leaves* large, from six inches to a foot long, and half as wide, oval, acuminate, pubescent, strongly plaited, and nerved, the lower part of their edges meeting round the stem; *upper leaves* gradually narrower; the *uppermost*, or bracts, linear, lanceolate; all alternate. The *flowers* are numerous, green, in compound racemes axillary from the upper leaves, and terminal; the whole forming a sort of panicle. *Peduncles* roundish, downy. *Bracts* boat-shaped, acuminate, downy. *Pedicels* many times shorter than the bracts. *Perianth* divided into six green, oval, acute, nerved segments, of which the alternate ones are longest; all the segments contracted at base into a sort of claw with a thickened or cartilaginous edge. *Stamens* six, with recurved filaments and roundish two-lobed anthers. *Carpels* three, cohering, with acute recurved styles as long as the stamens. A part of the flowers are barren, and have only the rudiments of styles, so that the plant is strictly polygamous. The *seed-vessel* consists of three capsules, united together, separating at top, and opening on their inner side. *Seeds* flat, winged, imbricated.—*L.*

History.—American Hellebore is indigenous to the United States, growing in swamps, low grounds and moist meadows, flowering in June and July. The officinal part is the rhizome, which should be gathered in autumn, after the decay of the leaves. As it rapidly loses its virtues, it should be renewed annually, and kept in well-closed vessels. When fresh it has a very strong unpleasant odor; when dried it is nearly inodorous, and has a sweetish-bitter taste, succeeded by a persistent acridity. Its physical and therapeutical properties strongly resemble those of the white Hellebore, and according to Mr. Worthington, of Philadelphia, it contains veratria, gallic acid, extractive, etc. Mr. W. precipitated a cold infusion of the root with subacetate of lead, separated the excess of lead with sulphureted hydrogen, evaporated to one-half, boiled with an excess of magnesia. The precipitate was collected on a filter, dried, treated with boiling alcohol and animal charcoal, and the filtered alcoholic solution evaporated. The light-colored pulverulent residue was nearly insoluble in water, more soluble in ether, and very soluble in alcohol. It melted when heated, and burned without residue; had a burning acrid taste, acted powerfully as a sternutatory, and formed salts with the acids, of which the sulphate, tartrate, and oxalate only were crystallizable. From these properties, Mr. Worthington infers its identity with veratria; but it is probable that it is not veratria, but like *colchicia*, a distinct, though analogous principle.—*Am. Jour. Pharm. XXV.*, 110. Since these experiments, Mr. Joseph G. Richardson has proven that the alkaloid obtained from sabadilla, and that from Veratrum Viride are identical, that it is veratria. An interesting paper by him, detailing his experiments, will be found in the *Am. Jour. Pharm. XXIX.*, 204.

Properties and Uses.—American Hellebore exerts an influence upon the system similar to that of white Hellebore. In large doses it is dangerous, producing dizziness, pain in the head, impaired vision, dilation of the pupils, depression of the nervous, muscular and vascular systems, and other unpleasant symptoms of a narcotic character. In medicinal doses, it has been recommended by Prof. Tully in gout, rheumatism, etc., as equal, if not superior to colchicum. Dr. Osgood affirms it to be an excellent agent in all diseases in which it is required to diminish the activity of the heart and arteries, and his observations have been confirmed by the united testimony of those practitioners who have used the tincture of the root as prepared by Dr. Norwood. Dr. Tully also speaks of it as possessing alterative, emetic, errhine, and epispastic properties. It is commonly given in the form of tincture,—ten drops (gradually increased until some effect is produced) every two, three, or four hours. The extract, or inspissated juice may be commenced with one-fourth of a grain, and carefully increased as required. The powdered root may be given in from four to ten grain doses. The *V. Parviflorum* and *V. Angustifolium*, of this country, are probably medicinal, and should be investigated.

Dr. W. C. Norwood, of Cokesbury, S. C., in some recent communications published in the Southern Medical and Surgical Journal, states that from actual experiments made by himself this plant has proved:

1. Slightly acrid, and confining this action mostly to the mouth and fauces.

2. Expectorant, and unsurpassed by any other article for which this property is claimed.

3. Diaphoretic, being one of the most certain belonging to the Materia Medica; often exciting great coolness or coldness of the surface; sometimes rendering the skin merely soft and moist, and at others producing ree and abundant perspiration, without reducing or exhausting the system.

4. Adenagic, deobstruent, or alterative, far surpassing iodine, and from which much advantage may be expected in the treatment of cancer and consumption.

5. Nervine, and never narcotic. This property renders it of great value in the treatment of painful diseases, and such as are accompanied with spasmodic action, convulsions, morbid irritability, and irritative mobility, as in chorea especially, epilepsy, pneumonia, puerperal fever, neuralgia, etc. And it produces its effects in this respect without stupefying and torpifying the system, as opium is known to do.

6. Emetic; it is slow, but certain and efficient, rouses the liver to action during its operation, and vomits without occasioning the prostration or exhaustion which follows the action of most other emetics. It is also superior to the majority of emetics, in not being cathartic. It is peculiarly adapted as an emetic in hooping-cough, croup, asthma, scarlet fever, and in all cases where there is much febrile or inflammatory action.

7. Arterial sedative. This he considers its most valuable and interesting property, and for which it stands unparalleled and unequaled as a therapeutic agent.

8. In small doses, it creates and promotes appetite, beyond any agent with which we are acquainted.

Dr. Norwood recommends the following formula for the tincture: Take of the dried root of Veratrum Viride, eight ounces; alcohol .835 sixteen ounces. Macerate for two weeks, express, and filter. To an adult, eight drops are given, and which must be repeated every three hours, increasing the dose one or two drops every time, until nausea or vomiting, or a reduction of the pulse to sixty-five or seventy ensue; then reduce to one-half in all cases. Females and persons from fourteen to eighteen, should commence with six drops, and increase as above; children from two to five years to begin with two drops, and increase one drop only; below two years of age, one drop. When nausea, vomiting, or other unpleasant effects ensue from its administration according to the above directions, they may be speedily relieved by one or two portions of syrup of morphia and tincture of ginger, or brandy and laudanum. He has reduced the pulse by its use, to thirty-five beats per minute, without exciting the least nausea or vomiting. In pneumonia, typhoid fever, and many other diseases, it must be continued for from three to five or seven days after the symptoms have subsided; and in typhoid fever, while using the Veratrum, quinia is absolutely inadmissible. It is administered in a little sweetened water. Its employment may be continued indefinitely, in moderate doses, or short of nausea, without the least inconvenience. Repeated trials have to a great extent proved the correctness of Dr. Norwood's statements.

VERBASCUM THAPSUS.

Mullein.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE LEAVES AND FLOWERS.

Description.—Mullein is a biennial plant, with a straight, tall, stout, woolly, generally simple *stem*, occasionally with one or two branches above, winged by the decurrent bases of the leaves, and from three to five feet high. The *leaves* are alternate, oblong, acute, decurrent, indented at the margin, rough, and densely tomentose on both sides. The *flowers* are of a golden yellow color, rotate, nearly sessile, and are arranged in a dense, spiked, club-shaped raceme; *calyx* five-parted and downy; *corolla* five-lobed, rotate, lobes broad and rounded, somewhat unequal; *stamens* five, the two lower smooth, the rest downy. *Capsule* or *pod*, ovoid-globose, two-valved, many-seeded.—*W.*—*G.*

History.—Mullein is common to the United States, growing in recent clearings, along the sides of roads, in slovenly fields, etc., flowering from June to August. Some botanists consider it to have been introduced from Europe. The leaves and flowers are the parts used. They have a faint, rather pleasant odor, resembling that of a mild narcotic, and a somewhat bitterish, albuminous taste, and yield their virtues to boiling water. Morin found the flowers to contain a yellow volatile oil, a fatty acid, free malic and phosphoric acids, malate and phosphate of lime, acetate of potassa, uncrystallizable sugar, gum, chlorophyll, and yellow resinous coloring-matter.

Properties and Uses.—Mullein is demulcent, diuretic, anodyne and antispasmodic. The infusion is useful in coughs, catarrh, hemoptysis, diarrhea, dysentery and piles. Its diuretic properties are rather weak, yet it is very useful in allaying the acridity of urine, which is present in many diseases. It may be boiled in milk, sweetened, and rendered more palatable by the addition of aromatics, for internal use, especially bowel complaints. A fomentation of the leaves also forms an excellent local application for inflamed piles, ulcers and tumors. The leaves and pith of the stalk form a valuable cataplasm in white-swellings, and infused in hot vinegar or water, it makes an excellent poultice to be applied to the throat in cynanche tonsillaris, cynanche maligna, and mumps. The seeds, it is said, will rapidly pass through the intestines, and have been successfully used in intestinal obstructions. They are narcotic, and have been used in asthma, infantile convulsions, and to poison fish. The infusion may be drank freely. The flowers, placed into a well-corked bottle, and exposed to the action of the sun, are said to yield an excellent relaxing oil.

Off. Prep.—Cataplasma Verbasci.

VERBENA HASTATA.

Vervain.

Nat. Ord.—Verbenaceæ. *Sex. Syst.*—Didynamia Gymnospermia.

THE ROOT.

Description.—Vervain, sometimes known by the names of *Wild Hyssop*, or *Simpler's Joy*, is an erect, tall, elegant, and perennial plant, with an obtusely four-angled *stem*, three or four feet high, and having opposite, paniculate branches above. The *leaves* are opposite, petiolate, lanceolate, acuminate, rough, and incisely serrate; the lower often lobed or somewhat hastate. The *flowers* are small, purplish-blue, sessile, tetrandrous, and arranged in long, erect, slender, imbricated, terminal and axillary, panicled spikes. *Calyx* five-toothed; *corolla* funnel-form, limb five-cleft, nearly equal; *seeds* four.—*W.*—*G.*

History.—Vervain is indigenous to the United States, growing along road-sides, and in dry, grassy fields, flowering from June to September. The root is the part used; it is woody and fibrous, faintly odorous and of a bitter, somewhat astringent, nauseous taste, and imparts its properties to water. There are several varieties of this plant, as the *V. Urticifolia*, or Nettle-leaved Vervain, with white flowers, the *V. Spuria*, with blue flowers, and others, the roots of which possess similar properties, but in a milder degree than the *V. Hastata.* Sometimes the leaves of V. Hastata are used instead of the root, but they are less active.

Properties and Uses.—Vervain is tonic, emetic, expectorant, and sudorific. As an emetic and sudorific it has proved beneficial in intermittent fever, given in warm infusion or in powder. In all cases of colds and obstructed menstruation it may be used as a sudorific. Taken cold, the infusion forms a good tonic in some cases of debility, anorexia, and during convalescence from acute diseases. It has been reputed valuable in scrofula, visceral obstructions, gravel and worms. The following application has been recommended as effectual in promoting the absorption of the blood effused in bruises, and allaying the attendant pain: Take of Vervain, senna, and white pepper, of each equal parts. Make a cataplasm by mixing with white of eggs. Dose of the powdered root, from one to two scruples; of the infusion, from two to four fluidounces, three or four times a day, or oftener if it is desired to vomit. The root of *V. Urticifolia* boiled in milk and water, with the inner bark of *Quercus Alba*, and the decoction drank freely, is said to be efficacious in cases of poisoning by the Rhus Toxicodendron. The *V. Officinalis* is a European plant, possessing similar properties with the above, but less active.

VERNONIA FASCICULATA.

Ironweed.

Nat. Ord.—Asteraceæ. *Sex. Syst.*—Syngenesia Æqualis.

THE ROOT.

Description.—This is an indigenous, perennial, coarse, purplish-green weed, with a tall striate or grooved, tomentose *stem*, from three to ten feet in height. The *leaves* are from four to eight inches long, by one or two broad, narrow-lanceolate, tapering to each end, serrulate, alternate, smooth above, the lower ones petiolate. The *flower-heads* are numerous, in a compact or loose, somewhat fastigiate cyme. The *corolla* is showy, dark purple, tubular, twice as long as the involucre. *Involucre* smooth, ovoid-campanulate; *scales* appressed, all but the lowest rounded and obtuse, without appendage.—*W.*—*G.*

History.—Ironweed is a very common plant in the Western States, growing in the woods and prairies, and along river streams, and flowering from July to September. The root, which is the part used, is bitter, and imparts its properties to water or alcohol. The *Vernonia Noveboracensis*, growing in the Eastern, Western and Middle States, and its variety *V. Præalta*, bearing purple flowers, and the *V. Tomentosa*, with some other species, possess similar medicinal properties.

Properties and Uses.—Ironweed is a bitter tonic, deobstruent, and alterative. In powder or decoction, the root is beneficial in amenorrhea, dysmenorrhea, leucorrhea, and menorrhagia. In intermittent, remittent, and bilious fevers, the decoction or a saturated tincture has been recommended. Said to have been useful in scrofula, and some cutaneous diseases. Dose of the decoction, one or two fluidounces; of the tincture, one or two fluidrachms. The leaves or powdered root in the form of poultice make an excellent discutient application to tumors.

VERONICA OFFICINALIS.

Speedwell.

Nat. Ord.—Scrophulariaceæ. *Sex. Syst.*—Diandria Monogynia.

THE LEAVES AND TOPS.

Description.—This is a roughish-pubescent plant, the *stem* of which is prostrate, rooting at the base, from six to twelve inches long, with ascending branches. The *leaves* are opposite, vary from ovate to obovate, but are generally elliptical, short-petioled, obtuse, serrate, mostly narrowed to the base, and an inch or an inch and a half long. The *flowers* are pale-blue, and arranged in long, axillary, erect, dense, many flowered, pedunculate racemes; *pedicels* shorter than the calyx. *Calyx* four-parted; *corolla* rotate. The *pods* or *capsules* puberulent, obovate-triangular, emarginate, strongly flattened, several seeded.—*W.*

History.—Speedwell is a native of Europe, and now very common in North America, growing on dry hills, and in woods and open fields, flowering from April to August. The leaves and tops are employed; they have a faint odor, and a slightly bitter and aromatic taste. The *V. Beccabunga*, or brook-lime, is found in most of the Eastern and Northern States, growing in small streams and near watercourses; this, together with the *V. Anagallis*, *V. Scutellata*, *V. Agrestis*, and *V. Peregrina*, possesses somewhat similar properties. They all impart their virtues to water.

Properties and Uses.—Speedwell is expectorant, alterative, tonic and diuretic. It was formerly administered in coughs, catarrhs, renal, and skin diseases, jaundice, etc. Likewise reputed beneficial in scrofula, and other diseases where alteratives are indicated, especially the *V. Peregrina;* to be given internally, and used as a wash. The *V. Beccabunga* is antiscorbutic, diuretic, febrifuge, and emmenagogue, and said to be beneficial in cases of obstructed menstruation, scurvy, fevers, and coughs. The decoction of the plants may be used freely.

VIBURNUM OPULUS.

High Cranberry.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK.

Description.—This is the *Viburnum Oxycoccus* of Pursh; it is a nearly smooth and upright shrub or small tree, rising from five to twelve feet in height; the *stems* are several from the same root, branched above. The *leaves* are three-lobed, three-veined, broadly wedge-shaped or truncate at base, broader than long; the *lobes* divaricate, acuminate, crenately-toothed on the sides, entire in the sinuses; the *petioles* have two or more glands at the base, and are channeled above. The *flowers* are white or reddish-white, and are disposed in rayed, pedunculated cymes; the marginal flowers are large and sterile, the inner flowers much smaller and fertile. The *fruit* is ovoid, red, very acid, ripens late, and remains upon the bush after the leaves have fallen; it resembles the common cranberry, and is sometimes substituted for it. The *V. Roseum*, Snowball, or Guelder-rosetree, is a cultivated European variety, with the whole cyme turned into large sterile flowers.—*W.*—*G.*

History.—This is a handsome indigenous shrub, growing in low rich lands, woods, and borders of fields, in the northern part of the United States and Canada, flowering in June, and presenting at this time a very showy appearance. The flowers are succeeded by red and very acid berries, resembling low cranberries, and which remain through the winter. The bark is the officinal part; as met with in the shops, it is in thin, longitudinally curved pieces, from one-fourth of an inch to two or three inches in length, and from two to six lines in width, with a dark-grayish epidermis, and whitish-yellow, or reddish-yellow internal integument; it has no smell, and a peculiar, not unpleasant, bitterish and astringent taste. It is frequently put up by the Shakers, when it is somewhat flattened from pressure. It yields its properties to water or diluted alcohol. A Chemical Institute of the city of New York, profess to have obtained the active principle of this plant, which they have called *Viburine.* I have not been able to learn its mode of preparation, nor have I seen any of it, and therefore can not recommend it. There is a great disposition among some of the manufacturers of concentrated remedies to keep their processes secret; this is very reprehensible, and the maxim can not be too frequently repeated—"Never use a prepared remedy unless its mode of preparation is made known"—to do differently savors of charlatanism. Beside, great imposition may be practiced upon physicians by designing and speculating individuals.

Properties and Uses.—High-Cranberry bark is a powerful antispasmodic, and, in consequence of this property, it is more generally known among American practitioners by the name of *Cramp-bark.* It is very effective in relaxing cramps and spasms of all kinds, as asthma, hysteria, cramps of the limbs or other parts in females, especially during pregnancy, and it is said to be highly beneficial to those who are subject to convulsions during pregnancy, or at the time of parturition, preventing the attacks entirely, if used daily for the last two or three months of gestation. The following forms an excellent preparation for the relief of spasmodic attacks, viz.: Take, of Cramp-bark, two ounces, scullcap, skunk-cabbage, of each, one ounce, cloves, half an ounce, capsicum, two drachms. Have all in powder, coarsely bruised, and add to them two quarts of good sherry or native wine. Dose, one or two fluidounces, two or three times a day. Dose of the decoction, or vinous tincture of Cramp-bark, two fluidounces, two or three times a day. It may be proper to remark here that I have found a poultice of low cranberries very efficacious in indolent and malignant ulcers; and applied round the throat in the inflammation and swelling attending scarlatina-maligna, and other diseases, it gives prompt and marked relief. Probably the High Cranberries will effect the same results. (See *Cataplasma Oxycocci.*)

VIBURNUM DENTATUM, Arrow-wood or Mealy-tree, called by the former name on account of its long, straight, slender branches or young shoots, is a somewhat smooth shrub, from six to twelve feet in height, growing in low grounds, damp woods and thickets, throughout the United States, with roundish-ovate, dentate-serrate, furrow-plaited *leaves*, on long, slender petioles. The leaves are two or three inches in diameter, the upper pair oval, the veins beneath prominent, parallel, and pubescent in their axils. The *flowers* are white, in pedunculate cymes, and appear in June. The *fruit* consists of small, ovoid-globose, dark-blue berries.—*W.*—*G.*

The bark of this tree is ash-colored, and is employed as a diuretic and detergent, and has been highly recommended as an internal and external agent to cure cancer; the infusion to be used freely. It certainly deserves the attention of the profession in their treatment of this formidable disease. It may also be used in extract, pills, or plaster.

Off. Prep.—Extractum Viburni Hydro-alcoholicum; Tinctura Viburni Composita.

VIBURNUM PRUNIFOLIUM.

Black Haw.

Nat. Ord.—Caprifoliaceæ. *Sex. Syst.*—Pentandria Trigynia.

THE BARK OF THE ROOT.

Description.—This shrub or tree also known by the name of *Sloe*, is indigenous to this country, growing to the height of from ten to twenty feet. The *branches* are spreading, some of them often stinted and naked, giving the plant an unthrifty aspect. The *leaves* are about two inches long, and nearly as wide, roundish-ovate, smooth, shining above, obtuse at both ends, acutely serrate, with uncinate teeth, and situated on short petioles, slightly margined with straight, narrow wings. The *flowers* are white, in large, terminal, and sessile cymes. The *fruit* consists of ovoid-oblong, sweet, edible, blackish berries.—*W.*—*G.*

History.—This tree is found throughout the United States, being most abundant in the Middle and Southern States. It flowers from March to June, and presents at this time a very handsome appearance. It is usually found in woods and thickets. The bark of the roots, stem, and branches are medicinal, but that of the root is preferred. It is fawn-colored externally, with a feeble odor, and a very bitter, slightly aromatic taste. Water or alcohol extracts its properties. It is readily pulverized when dry, and affords a reddish-colored powder tinged with gray. It is said to contain extractive matter, gum, tannin, gallic acid, and a peculiar resinous principle, for which the name of *Viburnin* has been proposed. It is obtained by the usual process for separating the resinous principles from plants, and is a light reddish-brown powder, intensely bitter, possessing the properties of the bark in a concentrated form.

Properties and Uses.—Black Haw is tonic, astringent, diuretic, and alterative; the decoction has been used as a gargle in aphthæ, as a wash to indolent ulcers, and ophthalmic affections; and internally in chronic diarrhea, dysentery, and palpitation of the heart. It appears to exert an especial tonic influence upon the uterus, and is highly recommended in cases of threatened abortion, and as a preventive in cases of habitual miscarriage; in the latter case its use should commence a week or two previous to the aborting period, and be continued through the remaining period of pregnancy. It has also proved useful in relieving severe afterpains. The infusion may be given in half-fluidounce doses, several times a day; or the tincture, in doses of a fluidrachm, four or five times a day. The powder may be given in half drachm, or drachm doses.

VIOLA PEDATA.

Blue Violet.

Nat. Ord.—Violaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE WHOLE PLANT.

Description.—Blue Violet, or as it is sometimes called, *Bird's-foot Violet*, is an indigenous, stemless plant, glabrous, with the leaves and scapes all from perennial, fleshy, premorse, subterranean rootstocks. The *leaves* are pedately five to nine parted; the lobes being linear-lanceolate, obtuse, and nearly entire. *Petioles* with long, ciliate stipules at base. The *flowers* are large, very showy, an inch broad, pale or deep lilac-purple, and fragrant. *Peduncles* somewhat four-sided, much longer than the leaves. The segments of the *calyx* are linear, acute-ciliate, emarginate behind. *Petals* veinless, entire, and beardless. *Spur* or *beak* obscure. The *stigma* is large, flattened at the sides, obliquely truncate, and pierced at the top. —*W.*—*G.*

History.—This plant is common to the United States, growing from Maine to Florida, and west to Missouri, in dry woods and pastures, and sandy places, flowering in May and June. The herb and root are used, and impart their virtues to water.

The *Viola Odorata*, or *Sweet Violet* of Europe, is much cultivated in this country on account of its beautiful flowers, which appear in April and May. It is a small creeping plant, with flagelliform runners; the *leaves* are roundish-cordate. *Sepals* five, ovate, obtuse; *petals* five; *spur* very blunt. *Flowers* fragrant, deep purple, often white, occasionally lilac, on radical, furrowed, quadrangular peduncles. *Bracts* inserted above the middle of the scape. *Capsules* turgid, hairy, bursting with elasticity, many-seeded, three-valved. *Seeds* turbinate, pale.—*L.*—*De Cand.*

Both of these plants possess similar properties; the flowers are commonly employed, but the whole plant is medicinal. The flowers should be gathered as soon as they are fully expanded, the sepals removed, and then carefully dried. An infusion of the flowers of the V. Odorata, and probably of some others, may be used as a test for acids and alkalies, the former changing it to a red, the latter to green. Pagenstecher, in 1822, found the Viola Odorata to contain an odorous principle, blue coloring matter, crystallizable and uncrystallizable sugar, gum, albumen, and salts of potassa and lime. Boullay found the whole plant to contain an acrid principle, which he has termed *viola.* It is a white powder, bitter and acrid, slightly soluble in water, insoluble in ether, precipitated from its solution by infusion of nut-galls, and operating somewhat like emetia. It may exist in some other plants of this family. Boiling water extracts the virtues of these plants.

Properties and Uses.—The flowers and seeds of V. Odorata act as laxatives in doses of three or four drachms, rubbed up with sugar and water; the root in half-drachm or drachm doses is emeto-cathartic, but it is uncertain in its action. The seeds have been recommended in uric acid gravel. The odorous emanations from the flowers have caused faintness and giddiness, and in one case were supposed to have brought on apoplexy.

Blue Violet is mucilaginous, emollient, and slightly laxative; also antisyphilitic, and forms a valuable remedy for this disease, when combined with *Corydalis Formosa.* Has been used in pectoral, nephritic, and cutaneous affections, especially crusta lactea. The plant should be used when fresh, as drying destroys its active properties. The *V. Tricolor*, or pansy, may be used as a substitute. The roots of these plants are bitterish and slightly acrid, and in doses of from eight to ten grains are tonic; from twenty-five to thirty grains, purgative; and from forty to sixty grains, emetic.

The *Viola Ovata*, or Rattlesnake Violet, has been highly recommended in the bites of rattlesnakes, the infusion to be freely administered; and the infusion used internally, with a fomentation of the leaves locally applied, have proved efficacious in obstinate chronic ophthalmia; a similar course is reputed very valuable in scrofulous diseases. Probably all the species possess analogous properties; they are undoubtedly more active agents than are generally supposed, and deserve further investigation.

VISCUM FLAVESCENS.

Mistletoe.

Nat. Ord.—Loranthaceæ. *Sex. Syst.*—Diœcia Tetrandria.

THE LEAVES.

Description.—This is the *Viscum Verticillatum* of Nuttall, and *Viscum Album* of Walter; it is a yellowish-green, succulent parasite, growing on the branches and trunks of old trees, especially elms, oaks, hickories, etc. The *stems* are jointed, a foot or a foot and a half in length, rather thick, with many round, spreading, opposite, and sometimes verticillate, terete *branches.* The *leaves* are opposite, cuneate-obovate, three-veined, obtuse, smooth, entire, contracted at the base into a short petiole, and from nine to sixteen lines long, by from four to nine broad. The *flowers* are small, greenish-white, sterile ones mostly three-parted, and arranged in axillary, solitary spikes, about as long as the leaves. *Fruit* globose, yellowish-white, smooth, semi-transparent, with a viscous pulp, in clusters, and contain one fleshy seed ; they remain throughout the winter.—*W.*—*G.*

History.—This parasitic shrub is found growing on various trees; but that which is found on the oak is preferred. The bark and leaves have an unpleasant odor, and a mawkish, bitterish taste. The proper time for collection is in November, when it should be gradually dried, pulverized, and kept in a well-stopped bottle. It should never be kept more than a year, as age impairs its active qualities. The mistletoe growing on the water or black elm (*Ulmus Nemoralis*), and on the water-oak (*Quercus Aquatica*), is reputed to possess the most energetic medicinal virtues. All parts of the plant contain *viscin* or birdlime, which is very adhesive, soft, and elastic, having a greenish or brownish color, insoluble in water and fixed oils, slightly soluble in alcohol, very soluble in ether and oil of turpentine. According to Henry the berries contain viscin, green wax, gum, bassorin, brown extractive, lignin, salts of potassa, lime, magnesia, and oxide of iron, united to vegetable acids.

Properties and Uses.—Narcotic, antispasmodic, and tonic. Has been found beneficial in epilepsy, insanity, paralysis, and other nervous diseases. In using this agent it is always necessary to regulate the condition of the stomach and bowels, and the menstrual discharge, and other faulty secretions, and remove worms, if any are present, previous to its exhibition. It may be given in doses of from thirty to sixty grains, and gradually increased to three or four drachms, three or four times a day, and if it produces sleep or other narcotic effects, the doses must be diminished. This plant is by no means inert, and its failures in the hands of some practitioners must be attributed to the want of proper doses, or to the employment of an article which age or exposure to the air had injured. The powder is best given in an infusion of valerian.

VITIS VINIFERA.

The Grape.

Nat. Ord.—Vitaceæ. *Sex. Syst.*—Pentandria Monogynia.

THE FRUIT, AND ITS FERMENTED JUICE.

Description—This is a climbing shrub, which has been known in nearly all parts of the globe from a very early period. There are many varieties of it, which will generally be found to agree in most respects with the following description of De Candolle: *Leaves* lobed, sinuated, toothed, smooth or downy, flat or crisp, pale or deep green; the *branches* prostrate, climbing, or erect, tender, or hard; the *racemes* or *branches* loose or compact, ovate or cylindrical; the *fruit* or *berries* red, yellow, or purple, watery or fleshy, globose ovate or oblong, sweet, musky, or austere. *Calyx* somewhat five-toothed; *petals* five, cohering at the point, separating at the base, and dropping off like a calyptra. *Stamens* five. *Style* none. *Berry two-celled,* four-seeded; the *cells* or *seeds* often abortive.

History.—The Grape-vine grows wild in the south of Asia, and in Greece, and was, probably, first cultivated in the East, but at what period it is impossible to say; it must have been known to the antediluvians, as Scripture informs us that Noah, after leaving the ark, "planted a vineyard and drank of the Wine." At present it is cultivated in the warm temperate climates of Europe and America. The leaves and tendrils are somewhat astringent, and were formerly employed in diarrhea, hemorrhages, and other morbid discharges. The juice of the stem has also had medicinal virtues attributed to it, and is often added at the present day to washes for improving the hair and removing baldness. The juice of the unripe fruit is called *Verjuice*, and contains malic, citric, tartaric, and racemic acids, with bitartrate of potassa, sulphates of potassa and lime, a little tannic acid, etc. The juice of the ripe fruit is called *Must*, and contains sugar, gum, malic acid, bitartrate of potassa, various inorganic salts, etc.: when fermented it is called *Wine*. So long as the ripe Grape remains entire, it undergoes little change beyond gradual desiccation and a conversion of its acid into sugar; but if the Grape be crushed, or its juice expressed, and the temperature maintained at between 60° and 70°, fermentation ensues through the action of the air, and of the insoluble glutenoid principle existing in the husk, which acts the same part as that of yeast in the fermentation of malt or solutions of sugar. The consequence is the must becomes warmer, the sugar gradually disappears and carbonic acid escapes, which causes a *head*—the name given to the convex frothy matter which is formed on the surface of the liquor—and alcohol is formed at the expense of part of the tartaric acid in the bitartrate of potassa. There is also developed a volatile ethereal aromatic substance in small quantity, which is called œnanthic ether; but possibly this principle exists originally in the juice. When the process reaches a certain stage, the liquor, at first very turbid under the effervescence of fermentation, becomes gradually clear, of a peculiar odor and taste called vinous, and of a pale straw-color if the juice only was used, or if the Grapes have a colorless husk, but of a fine amber or deep red color if the husks were red and not separated. Left in this state to itself, the Grape juice, now become Wine, would ere long, under the influence of its ferment, undergo further changes, and lose its vinous character. But this is prevented, first by the action of sulphurous acid vapor on the ferment, and afterward by removing this principle entirely, as well as any other floating impurities, by a mixture of isinglass and white of egg, whose gelatin and albumen—forming bulky precipitates, the former with the tannic acid of the Wine, the latter by coagulation under the influence of its alcohol,—and carrying down with them all fine insoluble particles,—accomplish what is called the process of fining. Sometimes the process of fermentation is arrested at an early stage, while a considerable part of the sugar remains unaltered; and in this way are obtained the *Sweet Wines.* In other instances, when the fermentation is more advanced, but without its being arrested, the Wine, after undergoing peculiar management, is corked up in strong bottles; so that, as it continues to ferment, it becomes charged with carbonic acid, producing what are called *Sparkling Wines.* Much more generally the fermentation is permitted to go on, till by far the greater part of the sugar has disappeared, and the liquor becomes *still.* For the most part, such Wines are subsequently kept for some time in casks, to undergo the process of ripening, during which bitartrate of potassa is deposited in crusts, along with coloring matter, while what remains of the sugar of the juice, slowly undergoes complete conversion into alcohol. These Wines are called *Dry Wines.*

Wines differ considerably in their flavor, and in the respective proportions of their constituents; these differences depend partly on original differences in the Grape, partly on differences in climate or cultivation, partly on differences of management before, during, and after fermentation, and sometimes upon express additions being made, to alter the flavor.—*C.* Wines are designated according to their color, *red* or *white;* according to their taste and other properties, *sweet*, *acidulous*, *drying*, *strong* or *generous*, *light*, *rough*, *sparkling*, *still*, etc. The Wines of different countries are distinguished by names generally designating their place of manufacture, as follows: FRENCH WINES.—*Champagne* (of which we have the *still*, *creaming*, or *slightly sparkling*, the *full frothy*, the *white* and the *pink*); *Burgundy*, *red* and *white; Hermitage; Côte Rôtie; Rousillon; Frontignac; Claret*, the most esteemed being the produce of *Lafitte*, *Latour*, *Château Margaux*, and *Haut-Brion; Vin de Grave; Sauterne;* and *Barsac.* SPANISH WINES.—*Sherry* (Xeres); *Tent* (Rota); *Mountain (Malaga); Benicarlo* (Alicant). PORTUGAL WINES.—*Port*, *red* and *white* (Oporto); *Bucellas; Lisbon; Calcavella;* and *Colares* (Lisbon). An inferior description of red Port Wine is shipped at *Figuera* and *Aveiro.* GERMAN WINES.—*Rhine* and *Moselle Wines.* The term *Hock* (a corruption of *Hochheimer*) is usually applied to the first growths of the Rhine. The term *Rhenish* commonly indicates an inferior Rhine Wine. HUNGARIAN WINES.—*Tokay.* ITALIAN and SICILIAN WINES.—*Lachryma Christi; Marsala; Syracuse; Lissa.* GRECIAN and IONIAN WINES.—*Canadian* and *Cyprus.* MADEIRA and the CANARY ISLANDS.—*Madeira; Canary* (Teneriffe). CAPE OF GOOD HOPE WINES.—*Cape Madeira; Pontac; Constantia*, *red* and *white*, a sweet, luscious wine, much esteemed. PERSIAN WINES.—*Shiraz.* ENGLISH and AMERICAN WINES.—*Grape*, *Raisin*, *Currant*, *Gooseberry*, etc.—*P.*

The native *Catawba Grape*, introduced to public notice by Major Adlum of Washington city, is a superior Wine Grape, producing a most excellent Wine, which will undoubtedly supersede the use of all foreign Wines, at least, for medical and pharmaceutical uses. Mr. N. Longworth, of Cincinnati, has been for a long time engaged in the cultivation of this and other kind of Grapes, as well as in the manufacturing of *native Wines*, and by dint of perseverance and careful investigation has succeeded in preparing Wines which are fully equal to those of foreign origin. Longworth's *Catawba* and *Sparkling Catawba*, are becoming known throughout the country as superior articles, and their purity and freedom from adulterations render them preferable in all instances where these agents are indicated or required.

According to Gmelin, Wine consists of alcohol, an odorous principle, blue coloring of the husk in red Wine, tannic acid, bitter extractive, grape-sugar, gum, yeast, acetic acid, malic acid, tartaric acid, bitartrate of potassa, bitartrate of lime, sulphates and chlorides, phosphate of lime, carbonic acid, water, and in some of the Rhine Wines, paratartaric or racemic acid. The quantities of these constituents vary in the different Wines; thus, the sparkling Wines contain more carbonic acid than the others, the sweet Wines more sugar than the acid, and the astringent Wines more tannic acid, etc.

In a medicinal point of view the most important ingredient in Wine is the alcohol, which is found to vary in the different kinds, and which is so chemically combined with the other constituents as to modify its intoxicating influence, rendering it more impotent in this respect, than when given in the same portions in an undiluted state. Mr. Brande, in 1811, made an examination of Wines and liquors to determine the percentage of alcohol contained in them; M. Julia Fontenelle has also instituted similar investigations, as well as Dr. Christison; the following are the tables prepared by them, in which it will be seen that according to the more recent experiments of Dr. Christison, the quantity of alcohol in Wines has been, heretofore, somewhat overrated.

MR. BRANDE'S TABLE.

Rectified Spirit (825 *Dens*). *by volume in* 100.

Scotch whisky	54.32
Irish whisky	53.90
Rum	53.68
Brandy	53.39
Hollands	51.60
Lissa wine,	
strongest	26.47
mean	25.41
weakest	24.35
Raisin wine,	
strongest	26.40
mean	25.12
weakest	23.20
Constantia, white	19.75
Lachryma Christi	19.70
Sherry, strongest	19.83
mean	19.17
weakest	18.25
Vidonia	19.25
Lisbon	18.94
Bucellas	18.49
Constantia, red	18.92
Calcavalla,	
strongest	19.20
mean	18.65
weakest	18.10
Burgundy,	
weakest	11.95
Sauterne	14.22
Barsac	13.86
Champagne, still	13.30
sparkling	12.80
Tent	13.30
Rives Altes	12.79
Vin de Grave,	
strongest	13.94
mean	13.37
weakest	12.80
Côte-Rôtie	12.32

Mr. Brande's Table.—Continued.

Marsala, strongest	26.03
mean	25.09
weakest	25.05
Port, strongest	25.83
mean	22.96
weakest	21.40
Madeira, strongest	24.43
mean	24.17
weakest	23.93
Currant wine	20.55
Cape Madeira,	
strongest	22.94
mean	20.51
weakest	18.11
Red Madeira,	
strongest	22.30
mean	20.35
weakest	18.40
Sercial, strongest	21.40
mean	20.34
weakest	19.24
Teneriffe	19.79
Colares	19.75
Cape Muscat	18.25
Rousillon,	
strongest	19.00
mean	18.13
weakest	17.26
Grape wine	18.11
Malaga, strongest	18.94
mean	18.10
weakest	17.26
White Hermitage	17.43
Alba flora	17.26
Zante	17.05
Malmsey	16.40
Shiraz	15.52
Lunel	15.52
Syracuse	15.28
Claret, strongest	17.11
mean	15.10
weakest	12.91
Nice	14.63
Burgundy,	
strongest	16.60
mean	14.57
Red Hermitage	12.32
Gooseberry wine	11.84
Hock, strongest	14.37
mean	12.08
weakest	
Champagne, red,	
strongest	12.56
mean	11.93
weakest	11.30
Orange wine	11.26
Tokay	9.88
Elder wine	8.79
Cider, strongest	9.87
mean	7.54
weakest	5.21
Perry	7.26
Burton ale	8.88
Edinburgh ale	6.20
Dorchester ale	5.56
Average of ales	6.87
Brown stout	6.80
London porter	4.20
Small beer	1.28

M. JULIA-FONTENELLE'S TABLE.

Alcohol by volume in 100.

Bamyulls	21.96
Rives Altes	21.80
Colliouvre	21.62
Lapalme	20.93
Mirepeisset	20.45
Salces	20.43
Narbonne	19.90
Lezignan	19.46
Leucate de Fitou	19.70
Montagnac	19.30
Nissan	18.80
M ze	18.60
Bezieres	18.40
Lunel	18.10
Montpellier	17.65
Carcassone	17.22
Frontignan	16.90
Bourgogne	14.75
Bordeaux	14.73
Champagne	12.20
Toulouse	11.97

TABLE FROM CHRISTISON'S EXPERIMENTS IN 1838.

	Alc. by weight in 100 parts.	Proof-Sp. by vol.
Port, weakest	14.97	30.56
mean of 7 wines	16.20	33.91
strongest	17.10	37.27
White Port	14.97	31.31
Sherry, weakest	13.98	30.84
mean of 13 wines not long in cask	15.37	33.59
Sherry, strongest	16.17	35.12
mean of 9 long in cask in E. Indies	14.72	32.30
Dry Lisbon	16.14	34.71
Shiraz	12.95	28.30
Amontillado	12.63	27.60
Claret, first growth, 1811	7.72	16.95
Chauteau Latour, do. 1825.	7.78	17.06
Rosan, 2d growth, 1825	7.61	16.74
Vin Ordinaire, Bordx	8.99	18.96
Rives Altes	9.31	22.35
Malmsey	12.86	28.37
Rudesheimer, first quality.	8.40	18.44

Table of Christison's Experiments in 1838.—*Continued.*

	Alc. by weight in 100 parts.	Proof-Sp. by vol. in 100 parts.		Alc. by weight in 100 parts.	Proof-Sp. by vol. in 100 parts.
Sherry, Madre da Xeres	16.90	37.06	Rudesheimer, inferior	6.90	15.19
Madeira long in cask in the East Indies	14.09	30.80	Hambacher, first quality	7.35	16.15
strongest	16.90	37.00	Edinburgh ale, unbottled	5.70	12.60
Teneriffe, long in cask at Calcutta	13.84	30.21	Same ale, 2 years bottled	6.06	13.40
Sercial	15.45	33.65	London porter, four months in bottle	5.36	11.91

Table of the Proportion of Alcohol (*sp. gr.* 0.825 *at* 60° *F.*), *by Measure, contained in* 100 *parts of Wine.*

[*A.* means average; *F.* Fontenelle; *P.* Prout.]

		Brande.	*Others.*			*Brande.*	*Others.*
1.	Lissa	*A.* 25.41	15.90 *P.*	25.	Rousillon	*A.* 18.13	
2.	Raisia	*A.* 25.12		26.	Claret	*A.* 15.10	
3.	Marsala	*A.* 25.09		27.	Zante	17.05	
4.	Port	*A.* 22.96	18.40 *P.*	28.	Malmsey-Madeira	16.40	
5.	Madeira	*A.* 22.27	20.64 *P.*	29.	Lunel	15.52	18.01 *F.*
6.	Currant	20.55	21.20 *P.*	30.	Sheraaz	15.52	
7.	Sherry	*A.* 19.17		31.	Syracuse	15.28	30.00 *P.*
8.	Teneriffe	19.70	23.80 *P.*	32.	Sauterne	14.22	
9.	Colares	19.75		33.	Burgundy	*A.* 14.57	12.16 *P.*
10.	Lachryma Christi	19.70		34.	Hock	*A.* 12.08	
11.	Constantia, white.	19.75	14.50 *P.*	35.	Nice	14.63	
12.	Constantia, red	18.92	14.50 *P.*	36.	Barsac	13.86	
13.	Lisbon	18.94		37.	Tent	13.30	12.20 *F.*
14.	Malaga	18.94		38.	Champagne	*A.* 12.61	
15.	Bucellas	18.49		39.	Red Hermitage	12.32	
16.	Red Madeira	*A.* 20.35		40.	Vin de Grave	13.94	
17.	Cape Muschat	18.25		41.	Frontignal (Rivesalte)	12.79	
18.	Cape Madeira	*A.* 20.51		42.	Côte Rôtie	12.32	
19.	Grape Wine	18.11		43.	Gooseberry	11.84	
20.	Calcavella	*A.* 18.65		44.	Orange	*A.* 11.26	
21.	Vidonia	19.25		45.	Tokay	9.88	
22.	Alba Flore	17.26		46.	Elder	8.79	
23.	Malaga	17.26					
24.	White Hermitage.	17.43					

Many of the imported Wines are subject to adulteration, some of which it is difficult to detect. The addition of lead may be ascertained by the black precipitate occasioned on testing the Wine with sulphureted hydrogen; the presence of lime by the large amount of precipitate occasioned by the addition of a solution of oxalate of ammonia. Alum in Wines may be detected by boiling, which renders them turbid, with a flocculent precipitate; this is not the case with red Wines when free from any aluminous salt. Sulphuric acid in Wines may be detected in very minute quantity by the rose-red color which a drop of the Wine will impart to ordinary glazed paper which has been dipped into a solution of starch and dried; Wine in which free sulphuric acid is not present, when thus dropped, produces a violet-blue color; in the former instance the structure of the paper is impaired, but not in the latter. Many counterfeit or spurious Wines are also prepared by unprincipled persons, some of which impair the tone of the stomach, and are not fit to be used as medicinal agents. *Port Wine* is frequently imitated with mixtures of rough cider, sloe-juice or damson-juice, red Cape, real Port, brandy, elder-juice, logwood, red tartar, etc. *Madeira* is frequently met with of a spurious character, being sometimes made of Cape Wine, brandy, Sherry, Port, mashed malt, etc. *Sherry* is often made of sugar, water, raisins, yeast, bitter almonds, spirit, etc. In this country many of the foreign Wines are closely imitated by mixtures of crab-apple cider, Catawba Wine, brandy, real Wines, sugar, honey, flavoring materials, etc. *Champagne* is seldom met with in this country, unless it be an imitation, hence the great preference given all over the country to Longworth's *Sparkling Catawba*, which is fully equal to imported Champagne. An excellent imitation of Champagne Wine is made as follows: Take of good cider (crab-apple cider is the best), twenty-eight gallons; fourth-proof brandy one gallon; genuine Champagne wine five gallons; milk one pint, bitartrate of potassa, half a pound. These are mixed together, allowed to stand for a time, and bottled while fermenting.

Ripe Grapes are a most delicious and refreshing fruit, the juice of which is especially adapted to patients with fevers, and which in large quantities prove aperient and diuretic, but, eaten moderately will be found beneficial to those disposed to diarrhea or dysentery; they are also useful in many instances of acid stomach. The skin and seeds of the Grape are indigestible, and apt to occasion serious intestinal disease, and should therefore never be used. Dr. Cullen considers ripe, sweet Grapes, the safest and most nutritive of fall fruits. Grapes, when properly dried, are denominated raisins, *Uvæ Passæ*, of which there are several kinds known in commerce. The finest are the Spanish or Malaga raisins, of which there are three kinds, *Muscatels*, *Sun or Bloom raisins*, and the *Lexia raisins*. *Corinthian raisins*, or *dried currants* (Uvæ passæ minores), are obtained from a very small Grape called the *Black Corinth*, and are produced at Zante, Patras, etc. Raisins contain more saccharine matter than fresh Grapes, as may be known by the saccharine efflorescence which is often seen upon their surfaces, and which is called *Grape sugar*, $C_{12}H_{14}O_{14}$. The juice of the ripe Grape has been found to contain extractive, Grape sugar, gum, glutinous matter, a little malic, tartaric, and citric acids, bitartrate of potassa, supertartrate of lime, malate of lime, and odorous matter.

Properties and Uses.—In moderate quantities Wine operates as a stimulant to the nervous and vascular systems, and the secreting organs. It quickens the action of the heart and arteries, diffuses an agreeable warmth over the body, promotes the different secretions, communicates a feeling of increased muscular force, excites the mental powers, and banishes unpleasant ideas. In a state of health, its use can be in no way beneficial, but on the contrary, its habitual employment in many cases proves injurious by exhausting the vital powers and inducing disease. The actual amount of injury it may inflict will of course vary with the quantity and quality of the Wine taken, and according to the greater or less predisposition to disease which may exist in the system. Maladies of the digestive organs, and of the cerebro-spinal system, gout, gravel, and dropsy, are those most likely to be induced or aggravated by it. Intoxication in its varied forms is the effect of excessive quantities of Wine. Wine, however, possesses a tonic influence not observed after the use of ardent spirit, and differs from it, likewise, in not inducing disease of the liver. Dr. Maculloch observes, "It is well known that diseases of the liver are the most common and the most formidable of those produced by the use of ardent spirits; it is equally certain that no such disorders follow the intemperate use of pure Wine, however long indulged in. To the concealed and unwitting consumption of spirit, therefore, as contained in the Wines commonly drunk in this country, is to be attributed the excessive prevalence of those hepatic affections which are comparatively little known to our Continental neighbors." (The French.)

As a medicinal agent, Wine is employed principally as a cordial, stimulant, and tonic; some, however, possess acid and astringent properties. Wine is useful in low forms of fever to support the vital powers, promote sleep, and relieve delirium and subsultus tendinum; it is also useful as a stimulating tonic in convalescence from fevers, and from various chronic diseases. It is often given with the best effects in cases of extensive ulceration, copious suppuration, gangrene of the extremities, and after profuse hemorrhages, severe operations, or extensive injuries. Whenever it causes dryness of the tongue, thirst, quick pulse, restlessness or delirium, its use should immediately be dispensed with, as well as in active inflammations. In tetanus, its free use has at times produced an apparent alleviation of the disease.—*P.* The best Wines for practical use, are Port, Sherry, or Madeira, among the stronger Wines; and among the weaker, Claret, Hock, Moselle, and Champagne. *Port* is a red or dark-purple, somewhat astringent Wine, and may be used as a stimulant tonic in cases of debility; it is apt, however, to cause constipation, and usually disagrees with weak stomachs. *Sherry* is a dark yellowish-brown white wine, having a pleasant and peculiar flavor, and containing a very small amount of free acid; it is best adapted for gouty patients, and those disposed to acid stomach, or uric acid deposits. *Madeira* is somewhat of the color of Sherry, is feebly acid, and more stimulating than Sherry; it is better adapted for old persons and weak, broken down constitutions, and for invalids. *Teneriffe* is similar to Madeira Wine, but less stimulating. Among the weaker Wines, none are equal to the *Claret* or *Bordeaux* Wine; this Wine is acid, and slightly astringent, and is the least injurious among the Wines. It may be used, as well as the Rhine and Moselle

Wines, where the urine deposits phosphates, in low fevers, etc., but should not be used in gout, and uric acid deposits. *Champagne* is more apt to cause headache than any other Wine, yet it is a good excitant and diuretic, useful in hypochondria, low stage of fevers, excessive debility, and in excessive vomiting during pregnancy or at other times. *Catawba Wines* are rather acid, and may be used as a substitute for Madeira and Claret. The dose of Wine varies from a teaspoonful to a wineglassful, to be repeated every one, two, or four hours, according to the circumstances of the case; it may be given alone, or mixed with water and sweetened, and if not contra-indicated, some nutmeg may be grated upon it. Wine may also be added to soups, gruels, milk, etc., and to nutritive and stimulating enemas. Wine is sometimes employed in the preparation of *Medicated Wines*, but from its liability to undergo decomposition, it is much more objectionable as a solvent than diluted alcohol.

Raisins are used in medicine principally for imparting a flavor to various infusions, decoctions, etc. When eaten freely they are apt to cause flatulency and other unpleasant symptoms, on account of their difficult digestibility. An excellent, pure and sparkling Wine may be made as follows: Take twelve pounds of good raisins, cut each raisin in two, and put them into a five-gallon demijohn, nearly filled with clean soft water; let it stand uncorked for about fourteen days, then filter, bottle, and cork well. Upon the residue, after the Wine is poured off, put as much water as before, let it stand a sufficient time, and the result will be a good White Wine vinegar.

XANTHORRHIZA APIIFOLIA.

Yellowroot.

Nat. Ord.—Ranunculaceæ. *Sex. Syst.*—Pentandria Polygynia.

THE ROOT.

Description.—This is a small, deciduous, indigenous shrub, from one to three feet in height, with a thick, horizontal deep yellow *root*, throwing up numerous suckers. The *stem* is short, woody, leafy above, with a bright yellow *bark* and *wood.* The *leaves* are pinnate, of about three pairs with an odd one, glabrous, and about eight inches long including the long petioles; they are two or three inches long, ovate or rhomboidal, sessile, incisely lobed and dentate, sometimes divided almost to the base on one side, pale green, smooth above, slightly pubescent beneath. The *flowers* are small, dull purplish-brown, and disposed in axillary, compound, drooping racemes, appearing with the leaves. *Calyx* consisting of five sepals, regular, spreading, deciduous; *corolla* of five obovate, concave, and two-lobed petals, smaller than the sepals, raised on a claw. *Ovaries* from five to nine. *Follicles* or *capsules* inflated, compressed, spreading, an inch and a half long, one-celled, two-valved, opening at the apex; *seeds* oval, flattened.—*L.*—*W.*—*G.*

History.—This plant is found along river banks in the mountains of Pennsylvania to Florida, being chiefly confined to the mountains. It is also found in some of the Western and South-Western States, flowering in March and April. The root is the officinal part; it varies in length from four to twelve inches, is about six lines in diameter, is bright yellow, and exceedingly bitter. Water extracts its virtues, and sulphate of iron is not incompatible with its infusion. The bark of the stem is equally as efficacious as the root. The Indians were well acquainted with it as a dye; it dyes silk a bright yellow, and wool a dark-brown or dun color.

Properties and Uses.—Yellowroot is a pure, bitter tonic; considered by the late Professor Barton to be superior to colombo. It may be used for all purposes in which the other simple tonic bitters are applicable. Dose of the powder one or two scruples, three times a day; of the decoction, one or two tablespoonfuls; of the tincture, which is its most eligible form from one to three fluidrachms. It contains a bitter resin, which would probably form an excellent tonic.

XANTHOXYLUM FRAXINEUM.

Prickly Ash.

Nat. Ord.—Xanthoxylaceæ. *Sex. Syst.*—Diœcia Pentandria.

THE BARK AND BERRIES.

Description.—This shrub is the *Xanthoxylum Americanum* of Miller, the *X. Fraxinifolium* of Marshall, the *X. Ramiflorum* of Michaux, and the *X. Tricarpum* of Hooker. It is known by the various names of *Northern Prickly Ash*, *Toothache-bush*, *Yellow-wood*, etc. It is an indigenous shrub, ten or twelve feet in height, with alternate *branches*, which are armed with strong, conical, brown *prickles*, with a broad base, scattered irregularly, though most frequently in pairs at the insertion of the young branches. The *leaves* are alternate and pinnate; the *leaflets* about five pairs with an odd one, nearly sessile, ovate, acute, with slight vesicular serratures, somewhat downy underneath. The *common petiole* is round, usually prickly on the back, and sometimes unarmed. The *flowers* are in small, dense, sessile umbels, near the origin of the young branches; they are small, greenish, diœcious or polygamous, appear before the leaves, and have a somewhat aromatic odor. In the *sterile* flower the *calyx* is five-leaved, with oblong, obtuse, erect segments, five *stamens* with subulate filaments, and sagittate, four-celled anthers; the ovary is abortive. In the *hermaphrodite* or *perfect* flower, the *calyx* and *stamens* are like the last, *ovaries* three or four, pediceled, with erect, converging *styles* nearly as long as the stamens. The *fertile* or *female* flowers grow upon a separate tree, are apetalous, with a smaller and more compressed *calyx*, and five pediceled *ovaries*, with *styles* converging into close contact at top, and a little twisted; *stigmas* obtuse. Each fertile flower is succeeded by as many capsules as it had ovaries. The *capsules* are stipitate, oval, covered with excavated dots, varying from green to red, two-valved, and one-seeded; *seeds* oval and blackish.—*L.*—*W.*—*G.*

History.—The Prickly Ash is a native of North America, growing from Canada to Virginia, and west to the Mississippi, in woods, thickets, and river banks, flowering in April and May before the appearance of the leaves. The whole plant contains medicinal virtues; the fragrance of the fruit and leaves is due to a volatile oil which may be extracted by alcohol or ether. Both the bark and fruit (berries) are officinal. The bark met with in the market is in fragments of various sizes, quilled, a line or two in thickness, with a light, ash-colored epidermis, which is frequently removed, internally whitish and glossy; that from the small branches frequently exhibits the prickles. It is faintly odorous, friable with an amylaceous fracture, and has a slightly aromatic taste succeeded by bitterness, and a persistent acridity. Its powder is light-gray. It yields its properties to boiling water or alcohol. The fruit or berries as met with in the shops, consists of an open, bivalved, oval capsule, about three lines in length and two in diameter, brownish and covered with excavated dots externally, whitish-yellow, and smooth internally, and usually with a portion of the stalk appended: they inclose an oval, shining, black, wrinkled seed, which in the dried state is hollow, and grayish-yellow, or light brownish-yellow internally, inodorous, very brittle, and having the peculiar taste of the capsule in a very faint degree; this seed is more often absent than present in the capsule, from whose opening it escapes, and may be generally found separated from it, but mixed up with the mass. The medicinal virtues of the fruit reside in the capsules, which have a faintly aromatic, peculiar odor, and a warm, pungent, peculiar, aromatic, and pleasant taste, both of which properties are more energetic in the recent than in the dried fruit. They depend upon a volatile oil for their properties, which they yield to alcohol or ether.

Dr. Staples found the bark to contain fixed oil of a greenish color, volatile oil, resin, coloring matter, gum, and a crystallizable matter, which he named *Xanthoxyline.*

Mr. W. S. Merrell has prepared an oil from the berries, which he calls *Oil of Xanthoxylum;* it is obtained by macerating the bruised berries in alcohol or ether, filtering, and evaporating. That made by the agency of alcohol is the most turbid and probably contains resin and extractive. It is of a dark-brown color, of a faint, peculiar odor, and of the taste peculiar to the berries in a high degree of concentration, being aromatic, and very warm and pungent. One pound of the berries yields about four fluidounces of the oil; and one fluidounce of this to thirty-two fluidounces of alcohol makes a good strong tincture, equal to one made by macerating two ounces of the berries in a pint of alcohol.

Mr. J. B. Robinson, formerly of this city, prepares an *ethereal oil* from Prickly-Ash bark; he makes a tincture with ether, filters, and then evaporates or distills off the ether. Four pounds of the bark thus treated yield one pound of oil. The oil made by Mr. Robinson is dark greenish-black in bulk, yellowish-green in thin layers, very fluid, possessing an odor of ether, and the peculiar taste of the bark in an eminent degree. It is soluble in alcohol, ether, and alkaline solutions, and will probably be found to possess the active principle of the bark in a concentrated form.

Properties and Uses.—Prickly-Ash bark is a stimulant, tonic, alterative, and sialagogue. Taken into the stomach it causes a feeling of warmth, slightly accelerates the pulse, and determines to the skin causing a gentle moisture. It is used as a stimulant in languid states of the system, and as a sialogogue in paralysis of the tongue and mouth. It has proved highly beneficial in chronic rheumatism, colic, syphilis, hepatic derangements, and wherever a stimulating alterative treatment is required. Combined with equal parts of pulverized blueflag and mandrake, it will bring on salivation, and is useful on this account in the treatment of scrofulous, syphilitic and other diseases where there is a want of susceptibility to the influence of other alterative agents; the mixture must be given in small doses, and repeated at short intervals. Externally, it forms an excellent stimulating application to indolent and malignant ulcers. Dose of the powder, from ten to thirty grains, three times a day.

Prickly-Ash Berries are stimulant, carminative, and antispasmodic, acting especially on mucous tissues. Combined with pokeberries, in the form of tincture, they are invaluable in chronic rheumatism, and tertiary syphilis. The tincture is also useful in all nervous diseases, spasms of the bowels, flatulency, and in diarrhea. In tympanitic distension of the bowels, during peritoneal inflammation, it is a safe and superior remedy, used internally and as an injection; half a fluidrachm to a fluidrachm, internally, every hour or two in sweetened water—and half a fluidounce of the tincture, with occasionally ten or twenty drops of laudanum added, according to the symptoms, given by enema every fifteen or thirty minutes. In Asiatic cholera, it was extensively used by many of the physicians of Cincinnati, and with great success; it acted like electricity, so sudden was its influence over the system; indeed, many patients likened its action to an electric shock, which seemed to diffuse itself throughout the whole frame. We gave it in teaspoonful doses, slightly diluted, and repeated, according to circumstances, every five, ten or fifteen minutes, with an injection, prepared as above mentioned, which was given immediately after each discharge from the bowels, and retained by the patient as long as possible. This is one of our most valuable agents. The dose of the tincture of the berries, as a carminative and antispasmodic, is from ten to thirty drops, three or four times a day. Used by some, during the intermissions, as a remedy in intermittent fever, which it is said to remove speedily. There is a material difference, in their influence on the system, between the tincture of the bark, or that of the berries, which should always be had in view. A patient with cholerine came very near losing life, in consequence of using the tincture of the bark, instead of the berries, as prescribed; the druggist who filled the prescription supposed the properties of each were similar, and that they could be safely substituted the one for the other. The *oil of Xanthoxylum* may be used for the same purpose as the berries, in doses of from two to ten drops in mucilage, or on sugar; and its tincture, made according to the formula above, may be administered in the same doses as the tincture of the berries.

The *Aralia Spinosa* is frequently but erroneously called by the name of Southern Prickly-Ash; it differs from the Xanthoxylum in its botanical character, as well as in its medicinal virtues. Mr. W. S. Merrell has been for some time engaged in the investigation of the true character of these plants, and he informs me that he is confident that the agent which was employed during the cholera, and has been used since, as the Aralia Spinosa, is really a Xanthoxylum. It is to be regretted that so much confusion should exist in relation to the identity of some of our valuable agents, and which is principally owing to the similarity of vulgar names among different plants, and an inattention to their systematic names and characters. We hope that the above doubt may be satisfactorily solved by those having the proper opportunities to effect it.

Off. Prep.—Enema Xanthoxyli; Extractum Xanthoxyli Fluidum; Tinctura Laricis Composita; Tinctura Xanthoxyli.

XANTHOXYLIN.

Xanthoxylin.

THE OLEO-RESINOUS PRINCIPLE OF PRICKLY-ASH BARK.

Preparation.—Prepare a saturated tincture of Prickly-Ash Bark, filter, distill off about two-thirds of the alcohol, and to the residue add Water,—the oleo-resin precipitates to the bottom. After precipitation has ceased, collect the oleo-resin, and wash it in clear water; allow it to subside, and then separate it from the water.

History.—The profession are indebted to Mr. W. S. Merrell for the preparation of this valuable agent, which possesses all the medicinal properties of the bark in a concentrated form. When in mass it is blackish, but of a reddish-brown color in thin layers; it has a peculiar odor, somewhat similar to that of most oleo-resins, and a peculiar, bitterish taste, quickly succeeded by a persistent pungency in the mouth and fauces. It is insoluble in water; partially soluble in aqua ammonia and liquor potassa, forming a solution with a soapy feeling; soluble in ether, from which aqua ammonia removes a portion without much change of color; soluble in oil of turpentine, and to a great or less extent in oil of savin, and some other essential oils; and soluble in alcohol, from which water precipitates it, forming a dirty-white solution. Acetic, nitric, sulphuric, and muriatic acids, when added to the alcoholic solution, occasion no precipitate.

Properties and Uses.—Xanthoxylin is stimulant, tonic, alterative and sialagogue, and may be used in all cases where it is desired to stimulate and strengthen mucous tissues. It forms an excellent remedy for rheumatism unaccompanied with inflammation, or where there is an asthenic condition of the system, and I have often used it for this purpose with cimicifugin, in doses of one grain of each, every one, two, or three hours, with much advantage. Combined with quinia, it will be found very beneficial in cases where quinia alone appears to exert no influence, and will prove a valuable agent in dyspepsia, accompanied with want of appetite, flatulence, and distress after eating, given in conjunction with ptelein. In low typhoid fever, Xanthoxylin will be found a valuable and permanent stimulating tonic, and may, when necessary, be added to laxatives, in that disease, to prevent too much prostration—it must, however, be employed only during the stage of prostration. It may be used alone as a stimulating tonic and alterative. Where a stimulating tonic is required for children after diarrhea, dysentery, or other debilitating diseases, a combination of hydrastin with Xanthoxylin, will admirably fulfill the indication. In chronic rheumatism I have found the following preparation highly beneficial: Take of Cimicifugin, Xanthoxylin and Apocynin, of each, *one drachm*, Proof-Spirits or Whisky *one pint*; mix. Of this, the dose is a tablespoonful three times a day, or sufficient to slightly affect the head, at the same time attending to the surface and excretory functions. Sometimes I add two drachms of guaiacum to the above. The dose of Xanthoxylin is from one to three grains, three or four times a day.

ZEA MAYS.

Indian Corn.

Nat. Ord.—Graminaceæ. *Sex. Syst.*—Monœcia Triandria.

THE FRUIT OR SEEDS.

Description.—Indian Corn is a monœcious, paniceous grass, annual, with a fibrous *root*, and an erect, leafy *stem*, channeled on one side, and from five to ten, and in some varieties, from fifteen to twenty feet high. The *male flowers* are terminal, racemose; *females* axillary, densely spiked. *Stamens* three. *Ovary* sessile, ovate. *Style* one, long, capillary. *Stigma* ciliated. *Caryopsides* roundish or reniform, arranged on a large cylindrical receptacle or rachis, popularly called the cob, generally in eight rows. The ordinary color of the ripe grains or caryopsides is yellow; but they are frequently met with white, party-colored, red, purple, or even black. —*W.—P.*

History.—Corn is a native of the warm latitudes of America, and its varieties are exceedingly numerous. It is extensively cultivated in the United States, and also in various other parts of the world, and is much used in these countries as one of the principle articles of diet. It is very nourishing and digestible, and is used in many forms in this country, as bread, mush, pudding, cakes, etc. It is incapable of being made into light or raised bread, on account of its small quantity of gluten. *Roasting-ears*, or *hot Corn*, as it is called in this country, consists of the young ears which are gathered just previous to becoming ripe and hard, and boiled in water; they form a very agreeable and nutritious food, but should not be used by those disposed to looseness or other intestinal derangements. According to Dr. Payen, Corn consists of starch, 67.55 parts; azotized matter, with a principle analogous to gluten, 12.50; dextrine, glucose, or congenerous substances, 4; fatty matters, 8.80; cellulose, 5.90; silica, phosphates of lime, magnesia, and soluble salts of potassa and soda, 1.25. The starch from Corn measures from .0010 of an English inch to .0001. About nine per cent. of a yellow oil has been procured from Corn, which is considerably used in lamps, etc. According to Fresenius, it consists of carbon, 79.68; hydrogen, 11.53; and oxygen, 8.79.

Properties and Uses.—Corn-meal forms a very palatable and nutritious gruel for the sick, and in the form of mush is an excellent diet for convalescents, as well as a good emollient poultice for ulcers, swellings, rheumatic pains, etc. An infusion of parched Corn is useful in allaying the nausea and vomiting attendant upon many diseases. It may be drank freely.

ZINCI CARBONAS.

Carbonate of Zinc. Calamine.

History.—There are two native ores of Zinc—one, Zinci Carbonas Impurum of the Materia Medicas, known by the name of *Calamine;* the other a silicate of the oxide of zinc called *Electric Calamine.* The former is the one used in medicine; it is found in various parts of Europe, and occurs crystallized, or in compact or earthy masses, presenting a gray, yellow, or brown color, and having a specific gravity of 4.2 to 4.5.

Calamine, or Impure Carbonate of Zinc, before being employed in medicine, is directed to be reduced to a powder, by first calcining it, reducing it to a very fine powder, usually in mills, and then submitting it to the process of elutriation. In this state it loses water and more or less carbonic acid, and becomes rather an *impure oxide of zinc.* It forms a grayish, yellowish, or pinkish powder, and is soluble in nitric, sulphuric, or hydrochloric acids, with little or no effervescence; some of its impurities may, however, be insoluble.

Precipitated Carbonate of Zinc, Zinci Carbonas Præcipitatus, is prepared by dissolving sulphate of zinc, carbonate of soda, of each, separately, four ounces, in boiling water, one pint; mix the solutions; when a double decomposition ensues, sulphate of sodium is formed in the solution, and carbonate of zinc precipitated. The precipitate must be washed with hot water, in order to remove all sulphate of sodium. This forms a Carbonate of Zinc, having the formula, 8 Zn O 3 CO_2+6 HO, and equivalent weight 442.4. It forms a fine, white, tasteless powder, insoluble in water, but soluble with effervescence in acids, and is sometimes erroneously called *flowers of zinc.*

The Lapis Caliminaris of commerce contains from 70 to 80 per cent. of sulphate of baryta, and is totally unfit for use where Carbonate of Zinc is wanted.—*F. Bringhurst*, *Am. Jour. Pharm.*, *XXIX.*, 308.

Properties and Uses.—Prepared Calamine is used as a dusting-powder for children, and as a mild desiccant and astringent application in chafings, intertrigo, excoriated nipples, ophthalmi tarsi, simple ulcerations, etc. The precipitated Carbonate of Zinc is used for similar purposes.

Off. Prep.—Ceratum Calaminæ.

ZINCI CHLORIDUM.

Chloride of Zinc.

Preparation.—This compound has also been known by the names *Muriate*, *Hydrochlorate*, or *Butter of Zinc.* It is prepared according to the London Pharmacopœia as follows: Take of Hydrochloric Acid, *one pint*, imperial measure, and mix it with Distilled Water *two pints*, imperial measure; to this mixture add Zinc, in small pieces, *seven ounces.* When the effervescence has nearly ceased, apply heat, until bubbles are no longer evolved. Pour off the liquor, strain it, and evaporate it until the salt is dry. Melt this in a lightly covered crucible by a nearly red heat, and then pour it out on a flat and smooth stone. When cold, break in pieces, and keep in a well stopped vessel.

History.—Zinc readily and completely dissolves in hydrochloric acid, with formation of Chloride of Zinc and evolution of hydrogen gas. Commercial zinc contains iron, but as this is unimportant in a medicinal view, it has not been thought necessary in the above process to separate it. Iron may however be removed, if desired, by sesquioxidizing the iron by nitric acid, redissolving the salt, adding a small quantity of chalk, or carbonate of soda, filtering after the precipitate has been deposited, and evaporating to dryness, and it may be again fused as in the above process.

Pure Chloride of Zinc is a white crystalline powder, odorless, and of a pungent saline, nauseous metallic taste; it rapidly deliquesces in the air; heated in a platinum spoon it fuses, yielding when cool a grayish-white mass; if the heat is continued, thick white vapors are given off, leaving finally a white mass, which while hot appears yellow, but on cooling quite white, or with only a slight yellow tinge. This residue is oxide of zinc with a trace of Chloride of Zinc, which can not be removed by heat. The neutral Chloride of Zinc does not volatilize as such, but separates into a volatile acid and a fixed basic salt; while a part becomes decomposed, chlorine is given off, and the metal acquires oxygen. The salt is readily soluble in water, alcohol, and ether; the solutions have an acid reaction; if they contain white flocculent matter, this is oxide of zinc, with a trace of chloride, from heating too strongly. The aqueous solution with a little acetic acid should give no violet color (*iron*) with tannic acid. Tannic acid gives a dirty white precipitate of tannate of zinc in the pure solution which is dissolved by acetic acid. A precipitate by chloride of barium is due to *sulphuric acid*. If sulphureted hydrogen is passed into the solution acidified with hydrochloric acid, and causes a yellow precipitate soluble in concentrated hydrochloric acid, *cadmium* is present; if it appears more or less brown, it is to be washed, digested with hydrosulphuret of ammonia, filtered, and the filtrate evaporated to dryness in a platinum spoon and heated to drive off all the sulphur; a yellowish-white powder remaining is *tin* in the form of a sulphuret, and which is soluble in hydrosulphuret of ammonia.—*Witt.* Chloride of Zinc dissolves copper, but not silver, and is used to separate mixed filings of these metals, and to restore the surface of plated copper which has been heated, as in soldering. In this case the silver sinks into the copper, and does not become visible until the outer surface of copper is dissolved off. A solution of Chloride of Zinc was patented by Sir William Burnett to prevent dry rot in wood, and as a disinfectant and antiseptic. The formula of Chloride of Zinc is $Zn\ Cl$; its equivalent weight 68.

Properties and Uses.—Large doses of Chloride of Zinc act as an irritant poison, producing a burning sensation in the stomach, nausea, vomiting, anxiety, short breathing, small quick pulse, cold sweats, fainting, and convulsions; in small doses it has been given in scrofula, chorea, epilepsy, and other nervous diseases. Its principal use is as an external agent; from two to five grains dissolved in a fluidounce of water may be used as an application to syphilitic and scrofulous ulcers, to the vaginal walls in leucorrhea, to the os uteri in ulceration, as an urethral injection in gonorrhea and gleet, and to the eye in the relaxed and congested condition of the arteries in inflammations of this organ. Its local action on living tissues, when not diluted, is that of a caustic or escharotic, depending partly on its affinity for albumen and gelatin, with which it forms difficultly soluble compounds; so that when placed in contact with living parts into whose composition these organic compounds enter, the chloride exercising its affinity, destroys the life of the part, unites with the albuminous and gelatinous matters present, decomposes the carbonate and hydrosulphuret of ammonia found in the secretion from malignant ulcerations, and forms a white eschar, which separates in from ten to twelve days. Its action is accompanied with a violent burning pain for several hours, or until it has destroyed the parts. Beside corroding the parts with which it is in immediate contact, it exercises an influence over the vital actions of neighboring parts, and produces no constitutional symptoms from its absorption. For cancers and malignant ulcers the following have been used: 1. Take one part of Chloride of Zinc, and mix it with two, three or four parts of flour, forming a paste with as little water as possible: a stronger preparation is made by mixing together two parts Chloride of Zinc, and one part chloride of antimony, with flour in quantity proportioned to the desired strength.—*Dr. Canquoin.* This paste must be continued after the removal of the eschar formed, until all the morbid tissue has been removed. 2. Take of chloride of bromine three parts, Chloride of Zinc two parts, chloride of antimony one part, chloride of gold one part, powder of liquorice, sufficient to make into a paste.—*Landolfi.* For manner of using see *College Journal of Medical Science*, Cin. O., 1856, p. 98, and *Braithwaite's Retrospect*, part 33, 1856, p. 48. The dose internally, of Chloride of Zinc, is one or two grains, dissolved in sufficient water. Solutions of carbonate of soda, or potassa, or of soap, may be freely given in cases of poisoning by Chloride of Zinc; these change it into an insoluble carbonate.

ZINCI OXYDUM.

Oxide of Zinc.

Preparation.—When the precipitated carbonate of zinc is exposed to a strong heat, it is deprived of its carbonic acid, and the oxide is left; this is the plan now recommended by the U. S. Pharmacopœia. Oxide of Zinc may also be prepared by combustion of the metal in the air, washing the oxide with water, and elutriating to remove any unburnt metallic particles. Zinc fuses far below a red heat, but instantly becomes covered with a gray pellicle (suboxide); on removing this, the zinc, at a red heat, breaks out into a bluish-white luminous flame, from the energetic combination with the oxygen of the air, which should be allowed freely to the fused metal; in this way it gradually becomes oxidized. Prepared thus it is sometimes called *Flowers of Zinc.*

History.—Pure Oxide of Zinc is a milk-white, tolerably light, odorless, and tasteless powder; it is not dissolved by water or alcohol. Exposed for some time to the air, it attracts carbonic acid, and should therefore be kept in well closed bottles. At a red heat it acquires, without further change a yellow color, which on cooling again disappears; at a stronger heat it fuses to a yellow glass. Heated on charcoal before the blowpipe, it is reduced and volatilizes completely; a small portion condensing forms a yellow ring on the cold charcoal, becoming white on cooling. It is readily soluble in dilute sulphuric, nitric, or hydrochloric acids, with effervescence, if *carbonic acid* be present. A gray color indicates metallic particles. Water digested with it should yield, when filtered and evaporated, no residue; should any occur and effervesce with dilute acids, it is *carbonate of soda.* If it effervesces with dilute acids, it contains either carbonate of zinc, lime, or magnesia. To determine if it is either of the latter, the nitric acid solution is supersaturated with ammonia, precipitated with hydro-sulphuret of ammonia, filtered, the excess of hydrosulphuret of ammonia driven off by boiling, and oxalate of ammonia added, a precipitate is *lime;* after filtering this, any precipitate caused by phosphate of ammonia is *magnesia.* If the residue left by evaporating the water boiled on the Oxide of Zinc, gives, when supersaturated with nitric acid, a white precipitate with nitrate of baryta, *sulphate* of soda is present; if the portion insoluble in water when dissolved in nitric acid gives a white precipitate with nitrate of baryta, it contains *basic sulphate of zinc.* If its nitric acid solution acquires a red color with sulphocyanide of potassium, *iron* is present. The formula of Oxide of Zinc is Zn O; its equivalent weight 40.5.—*Witt.*

Properties and Uses.—Oxide of Zinc in large doses produces irritation, vomiting, and sometimes purging. In small doses of from two to ten grains, it has been used in epilepsy, chorea, catalepsy, pertussis, hysteria, neuralgia, gastrodynia, etc., as a tonic, antispasmodic, and sedative. Long used it acts as a slow poison, causing *tabes sicca.* It is seldom used internally, as its effects are very uncertain. Applied to ulcerated or other secreting surfaces, it acts as a desiccant and astringent, and has been found useful as an application to excoriations, chaps and cracks of the nipples, simple ulcerations, ophthalmic and cutaneous affections, etc. In eczema, impetigo, and ophthalmia tarsi it has been found especially useful. An impure Oxide of Zinc, known by the name of *tutty,* is occasionally used for similar purposes, but it is inferior to the pure oxide.

Off. Prep.—Unguentum Zinci Oxidi; Unguentum Zinci Oxidi Compositum.

ZINCI SULPHAS.

Sulphate of Zinc.

Preparation.—Three parts of concentrated Sulphuric Acid are mixed with fifteen parts of Water in a leaden vessel, and while still warm two parts of commercial Zinc, in small pieces, are added and allowed to stand, with frequent agitation, for a few days; the vessel is then gently warmed, until no further action is perceptible, then one-eighth the weight of zinc already employed added, digested for a day or two, and filtered while hot. The solution is diluted to thirty-two parts with water, and two parts removed; these are precipitated with carbonate of soda not in great excess, and after washing, returned to the balance of the solution from which it was originally taken, and then chlorine gas is to be passed in until the solution smells of it. (This course precipitates the iron. The chlorine gas from $\frac{3}{8}$ part of hydrochloric acid and $\frac{1}{8}$ part of manganese, will be sufficient for two parts of zinc.) The solution of Sulphate of Zinc thus obtained is evaporated in a porcelain dish, the crystals dried on filtering-paper, at the ordinary temperature, and kept in a cool place; the mother-liquor is thrown away. From two parts of zinc, eight parts of crystallized sulphate are obtained.—*Witt.*

The Edinburg College observes that "This salt may be prepared either by dissolving fragments of zinc in dilute sulphuric acid till a neutral liquid be obtained, filtering the solution, and concentrating sufficiently for it to crystallize on cooling—or, by repeatedly dissolving and crystallizing the impure Sulphate of Zinc of commerce, until the product, when dissolved in water, does not yield a black precipitate with tincture of galls, and corresponds with the characters laid down for Sulphate of Zinc in the list of the Materia Medica."

Concentrated sulphuric acid exerts little or no influence on metallic zinc; but dilute sulphuric acid dissolves it readily. With evolution of hydrogen from the decomposition of water, the oxygen of which unites with the metal, and the oxide thus formed combines with the sulphuric acid and a certain portion of water, forming the sulphate, which may be obtained in crystals by evaporation. If the sulphuric acid be added at once to the Zinc and water, instead of gradually, a violent effervescence will take place, which may occasion a loss of some of the fluid. When carbon is chemically combined with the zinc, a disagreeable-smelling gas is evolved, carbureted hydrogen CH_2. If sulphur or arsenic is present, they are given off at the same time. The *White Vitriol* of commerce is an impure Sulphate of Zinc; it is prepared by roasting the native sulphuret of zinc, or zinc-blende of mineralogists, in a reverberatory furnace, then exposing it to the air in a moist state until the sulphuret is converted by oxidation of its sulphur and metal into the sulphate; this is lixiviated, and the solution, concentrated by evaporation, is poured into molds, where it concretes into cakes like loaf-sugar. In this state it contains many impurities, as copper, lead, cadmium, and especially iron, in the form of sulphates; and from which it may be purified by roasting, dissolving, and crystallizing it, and more thoroughly by dissolving it, immersing metallic zinc in the solution so as to displace the other metals, and then obtaining crystals by evaporation. A little iron is commonly left behind. Oxide of zinc added to the solution of white vitriol and boiled, will precipitate the iron as well as the other foreign metallic sulphates, by combining with their sulphuric acid.

History.—Pure Sulphate of Zinc forms colorless, right-rhombic prisms; it is odorless, and has a sharp, saline, bitter, astringent, nauseous taste. It slightly effloresces on exposure to the air. Heated, it fuses, loses water, again becomes dry, and at a red heat gradually loses all its acid, leaving pure oxide of zinc as a residue. It dissolves in two and one-third parts of cold, and in less than equal parts of boiling water; its solution reacts acid; alcohol does not dissolve it. Its watery solution is precipitated white by the alkalies or their carbonates, oxide or carbonate of zinc being thrown down; and either precipitate is soluble in an excess of the alkali. Of course, if iron be present, which is generally the case, it is not dissolved again. The solution will be colored blue by ammonia when copper is the impurity; but if it be iron, the ferrocyanide of potassium will render it bluish-white. Either of these reagents produce a white precipitate with a solution of pure Sulphate of Zinc. Sulphureted hydrogen gas throws down a white sulphuret of zinc. Sulphate of Zinc has the formula $Zn\ O\ SO_3$, and equivalent weight 80.5. The crystals have the formula $Zn\ O\ SO_3+7Ho$, and the equivalent 143.3. It is *incompatible* with ammonia, soda potassa, and their carbonates, milk, mucilages, lime-water, vegetable astringent infusions, hydrosulphurets, acetate of lead, etc.

Properties and Uses.—In large doses Sulphate of Zinc is an irritant poison, causing, vomiting, purging, coldness of the extremities, fluttering pulse, and great depression; but seldom occasions death. In doses of from half a scruple to half a drachm it occasions prompt vomiting, and on this account, as well as for the absence of that distressing nausea which usually follows other emetics, it is generally used to dislodge poisons from the stomach; its promptness and want of nausea, prevents any great degree of absorption of the poison to be removed. In doses of from one to five grains it is reputed tonic, astringent, and antispasmodic, and has been used in dyspepsia, chronic dysentery and diarrhea, chronic bronchial affections with profuse secretion, gleet, leucorrhea, intermittent fever, chorea, hysteria, epilepsy, spasmodic asthma, hooping-cough, etc. Like chloride of zinc, it has a great affinity for albumen and fibrin. By quite a large class of practitioners its internal use is entirely dispensed with for other agents of a more desirable character. Used in solution varying from one to six or eight grains of the salt to a fluidounce of water, it has proved beneficial as a collyrium in chronic ophthalmia, as an injection in chronic gonorrhea, gleet, and leucorrhea, as a gargle in ulceration of the throat, and relaxed uvula, and as a wash for ulcers attended with profuse discharge, or with loose flabby granulations. Applied to gangrenous or mortified parts the powdered Sulphate of Zinc corrects the fetor, and arrests further decomposition; it should be applied over the affected part, and then be covered with flour paste, or an elm poultice. Used in this manner it is also useful in malignant ulcerations, to check hemorrhages, etc. Combined with powdered bloodroot, it has been successfully used in nasal polypi, and also in phagedenic chancres. Sulphate of Zinc was the secret remedy of a cancer doctor of this city, who has acquired some considerable notoriety by means of puffing, advertising, and the publication of false statistics; at one time, I was strongly in hopes he really had a remedy for this distressing disease, cancer, but found that after having been treated by him and pronounced cured, the disease usually returned in from one to three years, eventually destroying the patient.

In cases where large doses of Sulphate of Zinc have been swallowed, the vomiting usually prevents any dangerous effects; any inflammation or irritation, however, that may be produced, should be met with mucilaginous drinks, opiates, etc., and be treated upon general principles.

Off. Prep.—Lotio Hydrastis Composita; Lotio Myrrhæ Composita;

Lotio Sodii Composita; Lotio Zinci Composita; Unguentum Zinci Sulphatis; Unguentum Zinci Compositum.

ZINGIBER OFFICINALE.

Ginger.

Nat. Ord.—Zingiberaceæ. *Sex. Syst.*—Monandria Monogynia.

THE RHIZOMA.

Description.—The Ginger plant has a biennial, tuberous *root* or rhizoma; the *stems* are erect, oblique, round, annual, invested by the smooth sheaths of the leaves, and two or three feet in height. The *leaves* are subsessile, on long sheaths, alternate, lanceolate, linear, acute, smooth above and nearly so beneath, bifarious, and four to six inches long by an inch broad; the *sheaths* are smooth, and crowned with a bifid ligula. The *scapes* are radical, solitary, a little removed from the stems, from six to twelve inches high, enveloped in a few obtuse sheaths, the uppermost of which end in tolerably long leaves, and terminate in oblong spikes, about the size of the thumb. The *exterior bracts* are imbricated, one-flowered, obovate, smooth, membranous at the edge, faintly striated lengthwise; the *interior* enveloping the ovary, calyx, and the greater part of the tube of the corolla. *Flowers* small, of a dingy-yellow color. The *calyx* is tubular, opening on one side, three-toothed; *corolla* with a double limb; outer of three, nearly equal, oblong segments; inner a three-lobed lip, of a dark purple color. *Sterile stamens* subulate; *filament* short. *Anther* oblong, double, crowned with a long, curved, tapering, grooved horn. *Ovary* oval, three-celled, with many ovules in each; *style* filiform; *stigma* funnel-shaped, ciliate, lodged just under the apex of the horn of the anther.—*L.*

History.—The native country of Ginger is unknown, though supposed to be Asia. It is cultivated in the tropical regions of Asia and America, and also at Sierra Leone. The flowers and stalks have a fragrant odor, which is especially developed when they are rubbed or bruised. The fresh root is perennial, firm, knotted, of a compressed roundish form, beset with transverse rugæ, covered with ash-colored bark, partly of a purplish-tinge, and sends off many long fibers and offsets. The internal substance of the younger roots is softish, fleshy, and greenish; of the older, it is compact, fibrous, whitish, and when powdered has a yellowish appearance.—*T.* The root forms the Ginger of commerce, and is gathered from December to March, or soon after the decay of the stalks. Green Ginger is sometimes imported from Jamaica; it consists of soft and juicy rhizomas with buds, which have merely been washed after collection. The young annual shoots when washed, scraped, peeled, and put in jars with syrup, form *Preserved Ginger*, of which Jamaica furnishes the finest kind. The rhizomes dug up, washed, and scraped, and then dried in the sun and open air, were formerly termed *White Ginger.* When picked, cleansed, scalded gradually in boiling water, and then dried in the sun, they form the *Black Ginger* of commerce. There are several kinds of Ginger, all of which, however, possess similar properties. The more common varieties are the *White Ginger* from Jamaica, and the ordinary *Black Ginger* from the East Indies. The first has its epidermis removed, and is hence said to be *uncoated*, and is usually of a pale yellowish color; the second retains its coat or epidermis, which is wrinkled and of a dark-gray color. They are both fibrous and amylaceous in texture, yet also somewhat resinous in fracture near the surface. A transverse section of the larger and more perfect pieces shows an outer, horny, resinous-looking zone, surrounding a farinaceous center, which has a speckled appearance from the cut extremities of the fibers and ducts. The odor of Ginger is peculiar, pungent, and aromatic, and its taste peculiar, powerful, aromatic and burning, but not disagreeable or nauseous when very small pieces are chewed. Age, and especially exposure, impair these active properties. Water, proof-spirit, and alcohol take up the virtues of Ginger. The best Ginger is that which cuts pale, but bright; its quality, however, must be judged of by its color, odor, taste, heaviness, and freedom from perforations by insects. Morin analyzed Ginger in 1823, and found its composition to be volatile oil, acrid soft resin, resin insoluble in ether and oils, gum, starch, lignin, vegeto-animal matter, osmazome, acetic acid, acetate of potassa, sulphur; the ashes contained carbonate, sulphate, and muriate of potassa, phosphate of lime, alumina, silica, iron, and manganese.—*P.*

The *Oil of Ginger* may be obtained by distilling Ginger with water. It is pale yellow, very fluid, of sp. gr. 0.893, boils at 475° F., has the odor of Ginger, a mild taste succeeded by hot acridity. It is composed of carbon and hydrogen, with water, and belongs to the same class of essential oils as the coriander oil; while Ginger belongs to the camphene group of aromatics.—*Papousek.* The root is probably indebted to this oil for its flavor.

The *soft resin*, to which the pungency of the root is due, may be obtained by digesting the alcoholic extract of Ginger first in water, then in ether, and evaporating the ethereal tincture. The residual resin is yellowish-brown, soft, combustible, aromatic in odor, and of a burning aromatic taste. It is soluble in alcohol, ether, oil of turpentine, and hot almond oil.—*P.*

Properties and Uses.—Ginger is stimulant, rubefacient, errhine, and sialagogue. When chewed it occasions an increased flow of saliva, and when swallowed it acts as a stimulating tonic, stomachic and carminative, increasing the secretion of gastric juice, exalting the excitability of the alimentary muscular system, and dispelling gases accumulated in the stomach and bowels. It is much used to disguise other drugs, concealing their nausea, or preventing their tendency to cause tormina. When taken into the nostrils, it causes severe sneezing. It has been used in combination with astringents or other agents, in diarrhea and dysentery; prepared with rhubarb, in the form of cordial or syrup, few articles are more valuable in cholera morbus, and cholera infantum. It is eminently useful in habitual flatulency, dyspepsia, hysteria, and enfeebled and relaxed habits, especially of old and gouty individuals; and is excellent to relieve nausea, pains and cramps in the stomach and bowels, and to obviate tenesmus. Combined with black-willow bark, it forms an excellent poultice for indolent ulcers; and has been used as a sialagogue to relieve paralytic affections of the tongue, toothache, and relaxed uvula. Ginger in powder formed into a plaster with warm water, and applied on paper or cloth to the forehead, has relieved violent headache. Cakes made of Ginger and molasses, with flour, etc., are very beneficial to the stomach, when eaten in moderation. Dose of Ginger, in powder, from ten to thirty grains; of the infusion, prepared by adding half an ounce of the powdered or bruised root to a pint of boiling water, one or two fluidounces. A large quantity of Ginger taken internally might produce serious effects.

A good Ginger wine may be made by boiling half a pound of the best Ginger, bruised, in six gallons of water, for half an hour, and then filtering the decoction. Place the decoction in a demijohn, and add to it six pounds of raisins, cut in two, and the thin rinds of five lemons. Let this stand until vinous fermentation has ensued, then filter, add one pint of French brandy, and an ounce and a half of good isinglass previously dissolved in some of the wine. Place this in a strong vessel, cork it well and securely, and keep it for six months in a cool cellar (the longer the better), then carefully remove the wine from any sediment which may ensue, and bottle it for use. It improves by age. A preparation called *Gingerine* may be prepared by adding a solution of salt to a strong essence of Ginger; or by carefully distilling off the spirit from the essence of Ginger.

Off. Prep.—Acidum Sulphuricum Aromaticum; Infusum Zingiberis; Pulvis Asclepiæ Compositus; Pulvis Jalapæ Compositus; Syrupus Zingiberis; Tinctura Zingiberis.

PART II.

PHARMACY.

COLLECTION AND PRESERVATION OF PLANTS.

It is of vital importance to the practitioner that the agents which he employs in practice be as perfect in their character as circumstances will admit; for, no matter how excellent a remedy may be when properly prepared, an inattention to the requisites demanded for their purity and excellence may prove very serious in its results. The custom pursued by some apothecaries of retaining on hand an old and inert stock of medicine, and palming it off upon the physician or his patient as genuine, is very reprehensible, and can not be too severely discountenanced, and we are glad that this practice is confined to but very few. It is the positive duty of the apothecary to furnish himself with good articles of medicine, to take especial care in preserving them, that they do not become soiled or otherwise injured, to prepare them, when called for, in a neat, scientific, and expeditious method, and to dispense them strictly according to the physician's prescription, without using his own judgment in the matter, or substituting other agents for those which may not be in his store, because, it is not to be expected that he should know the indications which the practitioner desires to fulfill, nor the especial object in view which originated the prescription. One exception, perhaps, may be made, in which the agents are of a deleterious or poisonous character, when, should the apothecary consider, from the largeness of the article, or its dose, if that can be ascertained, that a mistake or oversight may have occurred, it is then his duty not to alter or modify the prescription, but to send it back to the physician, or present it himself in person, that it may be examined and corrected. As by far the greater number of agents used in American practice are derived from the vegetable kingdom, an attention to the following observations will, as a general rule, insure pure and active medicines.

All medicinal plants, with but a few exceptions, have their active qualities more or less impaired by long keeping; hence, the pharmaceutist should, as a general rule, reject the supply of the previous year, and provide himself with fresh agents; with our indigenous remedies this is more especially necessary, as these can be, and should be, freshly collected every year. Plants should be gathered at a proper period, according to the portion designed for use, and which is generally recognized as being at the time when the natural juices of such part exist in it more copiously. Great attention should be bestowed upon this matter, as the reputation of an agent depends entirely upon its careful collection and preservation; thus many of our most active agents possess but little medicinal powers when young, and are at this early period often eaten without danger as greens, among which may be named the young shoots of poke, asclepias, dandelion, etc. Soil, climate, and cultivation exert a remarkable influence on the properties of plants, and, with the exception of the Labiatæ, whose aroma becomes much improved by cultivation, nearly all other plants become deteriorated and useless as medicines when reared under the hand of the cultivator. Plants found in their places of natural growth present the greatest degree of medicinal activity, consequently, it is recommended to gather these and no others. When found in an arid situation, the Umbelliferæ are usually aromatic; but are very apt to become more or less virulent when met with in moist locations; wet soils are best adapted for the Cruciferæ, while the reverse is true of the Labiatæ. The attention of the herb-collector should always be directed to these several points.

Roots.—Roots must be collected according to the character of the plant; thus an *annual* plant will yield the most actively medical root, just previous to the flowering season; though the generality of this class of roots are erroneously gathered after the flowering period, and consequently are less active and do not retain their qualities for any reliable time. The roots of *biennial* plants are most energetic if collected shortly after the leaves have fallen from the plant, in the autumn of its first year; some recommend gathering the roots of biennials in the spring of their second year, but this will be found applicable to only a few plants. The roots of *perennial* plants are most active when gathered at any time between the decay of the leaves and flowers, and the vegetation of the succeeding spring. *Bulbs* should be collected as soon as they have matured, but during the absence of vegetation; they are, as a general rule, more active soon after the loss of foliage.

Stems.—Herbaceous stems should be collected after the foliage has appeared, but before the blossoms have developed themselves. Ligneous or woody stems, as a general rule, should be collected after the decay of the leaves, and previous to the vegetation in spring.

Barks.—Barks are to be gathered when the most active part of the plant is concentrated in them, which happens in spring previous to flowering, and in autumn after the foliage has disappeared. At the proper season for collection, the bark will be found more easily detached from the root, body, or stem, than at any other period. Spring is usually preferred for resinous barks, and autumn for the others. Too much care can not be displayed in gathering barks. When too young or too old, they are apt to possess but little medicinal virtue, and should be thrown aside, together with impurities and all inert parts.

Leaves. — Leaves should be collected as soon as they have become matured, which is generally between the period of inflorescence and maturation of the fruit or seeds. It must be remembered that biennial plants do not perfect their leaves in the first year; consequently they must be gathered only during the second year of their growth.

Flowers.—Flowers should be collected either when they are about to open, or just after they have opened, and, occasionally, the buds are to be preferred to the expanded flowers. They, as well as the leaves, should be gathered in dry weather, after the dew is off them, or in the evening before it falls, and are to be freed from all foreign, decayed, and inert matters. *Aromatic Plants* are to be collected after the flower-buds are formed. *Stalks* and *twigs* are generally gathered soon after the decay of the flowers. *Berries, succulent fruits* and *seeds* are to be collected only when ripe, unless the medicinal virtue is contained in the unripe article.

Drying of plants.—The proper drying of vegetable substances is of the greatest importance, as the activity of this class of remedial agents frequently depends as much upon the method and care taken in drying them as upon their inherent qualities. Many remedies are often injured or rendered inert by an improper or careless mode of drying. All parts of plants should be dried as quickly as possible, but not so rapidly, nor at such a temperature as would destroy or dissipate their active properties.

Roots are to be well washed, rejecting worm-eaten and decayed portions, as well as removing all fibers and rootlets which possess no medicinal power. If they consist principally of fibers, with but a small rootstalk, they may be dried immediately, either by sun-heat, or by an artificial heat not exceeding 85° F. If they are juicy, it is better to dry them without slicing (as generally advised), because their juices will be thereby less liable to changes from the action of the atmosphere. It will be best to dry them in a room, artificially heated, the temperature not to exceed 110° F., nor below 75° F. The room should be so arranged as to permit the escape of moisture, as well as admit a free circulation of air, and the roots should be turned over thoroughly, at least as often as once in every twenty-four hours. Thick and strong roots may be cut into transverse pieces about four or five lines in thickness, and dried the same as the preceding; if the slices be strung upon threads, the drying process will be equally as good, and less troublesome. If they contain a tough, inert bark, this should be removed while the root is fresh. *Bulbs* may be dried similarly to the above, after having removed their external coats. Such roots as lose their virtues by drying, or are directed to be preserved in a fresh state, are to be kept buried in dry sand.

Barks and *stems* may be dried in the atmosphere in dry weather; or, in a room artificially heated, as above named, in damp weather; they should be spread thinly, and frequently be stirred: in some cases they may be tied or strung up loosely in small bundles, and dried as just named. *Twigs* and *woods* require a similar management.

Leaves should be removed from the stems, etc., and spread thinly on some kind of wicker-worked vessel, which will permit a free circulation through them. Then expose them in a darkened room heated to about 135° F., turning them twice a day, and continuing this until they are thoroughly dried. Some persons prefer tying the branches, to which the leaves are attached, in small bundles, hanging these up in the drying-room, and removing the leaves as soon as the process is finished. The leaves, when dried, must retain their natural color, or else their medicinal powers will be more or less injured. The usual method of drying leaves is to strip them from the stem, lay them loosely on the floor of a dark room, and turn them several times; and when dried, press them in packages. The custom of moistening or steaming leaves and other preparations previous to packing them in bundles, for the purpose of causing them to pack more solidly, and which is pursued by many collectors of medicinal plants, is exceedingly improper. The articles become very much deteriorated in quality thereby, and soon mold.

Flowers require considerable care and attention, in order to retain their smell and natural color. They should be dried rapidly, in the same way as named for drying leaves; and as soon as thoroughly dried, should be firmly compressed into packages, and kept in dry situations. Some flowers lose their active properties by drying; these may be kept loosely in large specie-capped jars. *Berries* and *succulent fruits* may be tied together in loose bundles, and these be suspended in the darkened drying apartment; or, they may be removed from the branches, and be loosely spread in thin layers on a frame of wicker-work, frequently stirring them until the process is completed. *Seeds* may be dried, when this is necessary, by the same method as directed for leaves separated from the stems. *Aromatic herbs* and *annual plants*, generally, when not too succulent, may be tied in small bundles, and dried as advised for leaves similarly prepared. Roots, leaves, barks, etc., whose medicinal virtues are lost by drying, should be collected at the proper season, and their properties retained by forming from them syrups, tinctures, or inspissated juices. By this means, the active medical virtues of many very valuable agents, which would otherwise be lost, may be preserved.

In the drying of plants, there is always a considerable loss of water, as well as some loss of their volatile constituents. The Edinburgh Dispensatory furnishes the following table, as showing the quantities obtained from 1000 parts of each article named, after desiccation:

Roots of	Arctium Lappa	301	Leaves of	Tanacetum Vulgare	196
	Asparagus off	388		Verbascum Thapsus	218
	Inula Helenium	187		Mentha Piperita	215
	Symphitum off	276	Flowers of	Anthemis nob	338
Bark of	the Elm	375		Amygdalus Persica	155
	Elder	292		Calendula off	144
	Willow	450		Thymus	340
	Bittersweet twigs	308		Verbascum Thapsus	175
Leaves of	Datura Stramon	110	Petals of	Papaver Rhœas	84
	Digitalis purp	180		Pæonia off.	175
	Hyoscyamus niger	135		Rosa rubra	330

Medicines, however carefully and skillfully they may have been collected and dried, will, nevertheless, soon become useless if they are not properly preserved from all injurious influences. They must in general be defended from the effects of moisture, too great heat, or cold, and confined air. When their activity depends on volatile principles, they must be preserved from the contact of air and light as much as possible. The action of long-continued light is very injurious to nearly all medicines. A very important item for the apothecary is, to obtain a dry storeroom, and one as free as possible from rats, mice, cockroaches, etc., and it should be so arranged with doors and windows, as to permit a proper ventilation after a period of damp weather, or whenever ventilation may be deemed necessary. All medicines should be kept excluded from light, air, and moisture as much as possible, and none should be stowed away so long as the least dampness is upon them. Most of our druggists keep their medicinal roots in barrels, or large boxes, which are perfectly dry, and freed from impurities, but they very frequently allow them to remain uncovered: it will be found a better plan to have them always covered. In the same way, all coarse parts of plants may be kept, as barks, woods, etc. And when articles are kept for any length of time, an inspection of them every six or twelve months will generally be found advantageous, as they may be still longer preserved by the removal of decayed parts, impurities, insects, etc.; and this re-inspection is more especially necessary when recent articles are to be added to older ones. Herbs, leaves and seeds, should first be compressed into paper packages, or into bags, and then packed in boxes or barrels. Powders, flowers, aromatic leaves, and articles possessing volatile constituents, should be kept in glass or earthen vessels well covered, or in tin canisters; when kept in glass vessels, these should be painted or varnished black on the outside to prevent the action of light; or, the glass itself may be opaque. The direct rays from the sun should never be permitted to fall upon vessels containing medicines. During very warm weather, or immediately after a protracted damp season, all medicines should be inspected, particularly those most liable to be affected by these conditions; by which means moldiness and the ravages of insects may be prevented. When insects have been discovered among powders, etc., it requires considerable patience and attention to remove them; various methods have been advised. As, for instance, keeping the cavity of the vessel in which they are found constantly saturated with the vapor from camphor, chloroform, ether, aromatic oil, etc., and also when the vessel is air-tight, by exhausting the air from it, or placing it under the receiver of an air-pump. But few druggists, however, will adopt this latter course, except to save some costly drug. For one mode of preserving drugs, see *Ergot*. *Oils, fixed* or *volatile*, are best preserved in a dark room, or cellar, the temperature of which does not exceed 60° F. *Concentrated preparations*, as *resinoids*, *oleo-resins*, *alkaloids*, *lactinated compounds*, etc., should always be kept well corked, and in a cool and dark place; light, the action of the atmosphere, dampness, or too great a degree of heat, will be found to impair their activity.

WEIGHTS AND MEASURES.

In the purchase and sale of medicines, the avoirdupois weight is used in this country; but in dispensing prescriptions and preparing medicinal mixtures, the Troy weight is employed. For the convenience of the apothecary, this has been disposed into grains, scruples, and drachms; thus, twenty grains being equal to one scruple; three scruples to one drachm; eight drachms to one ounce; and twelve ounces to one pound. This measure is frequently termed "apothecaries' weight." With fluids, wine-measure is the one which is recognized. Other measures of an approximate character are likewise frequently employed in dispensing medicines, as drops, teaspoonful, desertspoonful, tablespoonful, and wineglassful, but these should never be made use of where accuracy is absolutely necessary. (See Weights and Measures in the Appendix.)

For the measurement of liquids, graduated glass measures, varying from four to sixteen ounces, are made use of, in which any quantity not less than one fluidrachm may be proportioned; and for obtaining fractions of a fluidrachm, the minimeter, divided into sixty parts or minims, is a very useful instrument. The mode pursued by many apothecaries, of dropping liquids from the lip of the bottle, is very inaccurate and objectionable, from the fact that the drops of various liquids vary considerably in size, and even those of the same liquid vary considerably, according to the size of the vessel from which they are dropped, as the following results of Mr. Alsop's investigations verify:

	When dropped from a large bottle.	When dropped from a small bottle.
One fluidrachm of diluted sulphuric acid yielded	24 drops	84 drops.
do. of Scheele's hydrocy. acid	35 do.	70 do.
do. of distilled water	31 do.	54 do.
do. of solution of ammonia	40 do.	48 do.
do. of tincture of opium	84 do.	135 do.
do. of rectified spirit	100 do.	130 do.
do. of tinc. of muriate of iron	100 do.	150 do.

From this table will be seen the disadvantages of measuring medicines by drops, which not only vary in the manner above-stated, that is, from the difference in size of the vessel out of which they are dropped, but likewise from their differences in viscidity or cohesiveness, as well as from changes in the angle of inclination at which the vessel is held while dropping. To obviate the difficulty heretofore experienced in measuring fractions of a fluidrachm, Mr. Alsop has invented a *minimeter*, which practical experience has found to completely answer the intended purpose; it consists of a cylindrical glass syringe, having a small bore, and which is graduated into sixty equal parts or minims. Another minimeter has also been invented, equally as useful, and in some respects preferable to Alsop's. It consists of a cylindrical glass tube of small bore, divided into sixty equal parts or minims; at the top of this is blown a large bowl or reservoir, sufficiently large to answer the purpose, over which is fastened a thin piece of caoutchouc. The instrument is held between the thumb and middle finger, the forefinger then presses on the caoutchouc covering, thereby expelling all or part of the air contained in the reservoir; if the point of the divided tube be then dipped into the fluid to be used, and the pressure withdrawn gradually, the fluid will rise to any indication required, which point is easily regulated by the forefinger. To empty the instrument, renew the pressure upon the caoutchouc. Instead of fastening the caoutchouc upon the reservoir, it may be placed upon the top of a small funnel, made to fit accurately into and upon the reservoir.

DETERMINATION OF SPECIFIC GRAVITIES.

Specific gravity is the density or compactness of a substance, or the quantity of ponderable matter contained in a body compared with the space it occupies, and which is ascertained by dividing the weight of a body by its volume. Atmospheric air is universally taken as the standard of comparison for the specific gravity of gaseous substances, and pure water for that of liquids and solids. In medicine, the apothecary will frequently desire to know the purity of any given drug, which in most cases may be readily determined upon ascertaining its specific gravity. The most correct method of determining the specific gravity of a liquid is by means of a small bottle, graduated to hold exactly 1000 grains of pure water at 60° F.; the bottles with stoppers are the best. The bottle is to be filled with the liquid, the stopper replaced, in doing which some air and liquid will be forced out, and then the bottle must be wiped dry and clean. It is next to be weighed very carefully, and the weight is the specific gravity; thus, the bottle holds exactly 1000 grains of pure water, but if, when filled with some other fluid, it be found to weigh less than 1000 grains—say 930 grains—then the specific gravity of that fluid is written .930; but if it weigh more than 1000 grains—say 1650 grains, or 12,675 grains—then the specific gravities will be 1.650 or 12.675. Or, the following equation may be employed: As the weight of water in grains, 1000, is to the weight of the liquid 12,675, so is 1 to the specific gravity:

1000 : 12,675 : : 1 : 12.675.

Any one can make a bottle of this kind, at least as correct for practical purposes as a hydrometer, by placing in a two or four drachm vial a certain amount of water at 60° F., marking its height on the bottle with a diamond point, and then weighing it. The density of other liquids will be determined by filling the bottle up to the mark with such liquids, and weighing it. If exactly 1000 grains of pure water are marked off, the weight of the liquid will give the specific gravity as above; but if the water weigh more or less than 1000 grains, then the gravity must be determined by calculation according to the above equation. Thus, suppose the mark indicated 350 grains of water, and the fluid to be tested at the same mark weighs 375 grains, then—350 : 375 : : 1 : 1.07142+.]

For purposes of convenience and facility in ascertaining specific gravities, certain instruments are used, called *Hydrometers*. There are several kinds of hydrometers, which are named according to the liquids for which they are intended, as for instance, *Saccharometers* to determine the specific gravity of syrups; *Alcohometers* to determine the specific gravity of alcohol; *Elaëometers* to test the purity of certain oils; *Galactometers* for ascertaining the quality of milk; *Urinometers* for ascertaining the specific gravity of urine. Hydrometers are also named according to their peculiar construction, or to the character of the graduated scale, as *Fahrenheit's*, *Nicholson's*, which is also applicable for taking the specific gravities of solid substances; *Cartier's*, for liquids lighter than water; *Baumé's*, for all kinds of liquids; *Twaddle's*, *Zanetti's*, *Sikes'* and various others. Baumé's is the one more commonly used in pharmacy, an improvement upon which has been made by Dr. W. H. Pile of Philadelphia, from whom they, as well as specific-gravity bottles and all kinds of hydrometers, can be obtained. His improvement consists in having both the degrees of Baumé as well as the specific gravity, accurately represented on the graduated scale.

The specific gravity of fluids may be readily determined by the following methods: If the weight of the fluid *exceed that of water*, ascertain the degree of Baumé, and deduct this from 145; by then dividing the remainder into the same number (145), the specific gravity is obtained. By a reversed method the specific gravity may be converted into Baumé, thus: find the specific gravity and divide 145 by it; deduct the quotient from the same number (145), and the result gives the degree of Baumé.

If the weight of the fluid is *less than that of water*, a different process must be pursued. Having ascertained the degree of Baumé, add 130 to it, and divide the remainder into 140, which will give the specific gravity. By a reversed process the specific gravity may be converted into Baumé, thus: find the specific gravity and divide 140 by it; deduct from the quotient 130, and the result gives the degree of Baumé.

"The specific gravity of solid bodies is ascertained, by first accurately weighing the substance in the air, and then by means of a hair or slender silken thread attached to the body, or to the scale of the balance, weighing it again in distilled water; take the difference between the two weights, and divide it into the weight in the air. The difference between the two weights, gives the weight of a quantity of water equal to the bulk of the solid, and the division gives the specific gravity of the body. Thus, if a body weighs 630 grains in air, and 600 grains in water, the difference between the two, 30 grains, is the weight of the bulk of water displaced by the body, or of a bulk of water equal to that of the body; this weight of the displaced water being divided into the weight of the body in air, 630, gives the specific gravity of this body, 21.000.

If, however, *the solid be lighter than water*, some modification of this process is required, which may be illustrated by taking the specific gravity of a piece of wax. The weight of the wax in air is 105.4 grains. On immersing the wax in water, two pressures are exerted; a pressure downward, equal to the gravity or weight of the wax, and a pressure upward, equal to the weight of the volume of water displaced by the wax; but the specific gravity of water being greater than that of wax, the upward pressure preponderates, and the wax rises to the surface. Thus we find that a volume of water equal to that of the wax, weighs as much as the wax, and something more. We must ascertain how much more, and this is done in the following manner: Some body heavier than water, and the weight of which in water is known, is attached to the wax, which has been previously weighed alone in the air, and the two bodies are weighed in the water together. A piece of lead may be used for this purpose. The lead alone, for instance, weighs 378 grains in water; with the wax attached to it, the weight in water is 372.4 grains, making a difference of 5.6 grains; and this 5.6 grains is equal to the excess of the upward, over the downward pressure on the wax when immersed in water. Thus, a volume of water equal to that of the wax, weighs 5.6 grains more than the wax; or, the weight of the wax in air, $105.4+5.6=111$ grains; then $111 : 1 :: 105.4 : 0.949$, the specific gravity of the wax.

It sometimes happens that the solid substance, the specific gravity of which is to be determined, is *in powder*, or *in several small particles*. In such cases, it is found convenient to proceed as in the following method of taking the specific gravity of calomel:—

100 grains of calomel are introduced into a specific-gravity bottle, which holds 1000 grains of distilled water; the bottle is filled up with water, and the weight of the contents is found to be 1083.7 grains; deducting the weight of the calomel (100 grains) from this, the remainder (983.7 grains) will be the weight of the water in the bottle, and the difference (16.3 grains) between this and 1000 grains, the weight of the whole contents of the bottle when filled with distilled water, is the weight of a volume of water equal to the volume of the calomel.

Then, 16.3 : 1 : : 100 : 6.03, the specific gravity of the calomel.

In taking *the specific gravity of substances soluble in water*, other modifications of the process are required. Sometimes the substance may be covered with a thin coating of varnish, so as to protect it from the action of the water. This method answers very well for blue pill, which may be brushed over with a strong tincture of mastic, and then proceeded with as in the case of the lead. In other instances, however, it is necessary to pursue a different course. Thus, any powder that is soluble in water, must have its specific gravity taken, in the first instance, with reference to some liquid in which it is not soluble. Spirit of wine, oil of turpentine, or olive oil, may be used in such cases. The process may be illustrated by describing the method of taking the specific gravity of guano in oil of turpentine.

In the first place, the specific gravity of the oil of turpentine is ascertained to be 0.874. Then 100 grains of guano are introduced into a specific-gravity bottle, as in the case of the calomel; and the bottle being filled up with oil of turpentine, the weight of the contents is found to be 922.7 grains, from which, deducting 100 grains, the remainder (842.7 grains) will represent the oil not displaced by the guano; and this, deducted from 874 grains, the quantity of oil the bottle is capable of holding, leaves 51.3 grains as the weight of a volume of oil of turpentine equal to that of guano. Now, 874 : 51.3 : : 1000 : 58.7, the weight of a volume of water equal to that of the guano.

Then, 58.7 : 1 : : 100 : 1.7, the specific gravity of the guano."—*Gray's Supplement to the Pharmacopœia, by Redwood.*

PULVERIZATION, ETC., OF MEDICINES.

Drugs are reduced to a state of powder, by several processes, which will be presently described. All the officinal powders, however, are now prepared on a large scale by wholesale druggists and others, or, the retailer can have any article reduced to powder by sending it to the drug-mills, where the grinding and pulverization of drugs is followed as a business, and one or more of which establishments are to be found in every large city. But on account of the frauds frequently practiced, most retailed druggists prefer to prepare many of their own powders in order to have them pure and genuine; beside which, it often becomes necessary to powder small portions of medicines not usually kept in this form.

For the coarse division of drugs, knives are necessary for the purpose of dividing fibrous and tough articles into narrow transverse fragments, and a mill or mortar for reducing them into still finer particles. For some drugs an ordinary spice mill will answer, but for the greater part, a Swift's drug-mill will be found very convenient both for coarse and fine powders. The other methods pursued by the druggist are as follows:

Pulverization.—The article being well dried, and all impurities and inert parts removed, is placed in a metallic mortar, either of iron, bell-metal, or brass, though iron mortars are more commonly used for all drugs, except those containing tannic or gallic acids. The bottom of the mortar should be concave; and its sides should neither be so inclined as not to allow the substances operated on to fall to the bottom between each stroke of the pestle, nor so perpendicular as to collect it too much together, and thus retard the operation. The pestle should be of the same material as the mortar, and its operating extremity should be somewhat bulbous or tuberous, with a convex surface adapted to the concavity of the bottom of the mortar. The mortar should be provided with covers to prevent the finest and lightest parts from escaping, and to defend the operator from the effects of disagreeable or noxious substances. But these ends are more completely attained by tying a piece of pliable leather round the pestle, and round the mouth of the mortar. It must be closely applied, and at the same time so large as to permit the free motion of the pestle. In some instances, it will be even necessary for the operator to cover his mouth and nostrils with a wet cloth, and to stand with his back to a current of air, that the very acrid particles which arise may be carried from him. Too great a quantity of any substance must never be put into the mortar at a time, as it very much retards the operation.—*Coxe.* If the upper end of the pestle be attached to the end of a somewhat flexible pole, the other end of which is stationary, forming a kind of elastic spring, it will be found to facilitate the operation very much, by the aid it affords in raising the pestle. After *contusion* has been continued for some time, the contents of the mortar are thrown upon a fine sieve, and after the finer particles have been sifted through, the coarser are to be again returned into the mortar for further bruising; and this course, contusion and sifting, should be pursued alternately from time to time, until complete pulverization is effected. Several sieves, of various degrees of fineness should always be kept on hand. For small powderings, a large wooden pill-box, three or four inches in diameter, may be made into a sieve, by removing the head from its cover, and likewise its bottom; a piece of book-muslin may be kept stretched on one end of the box by means of the cover, thus forming a sieve of any required degree of fineness. To avoid any loss of powder, and at the same time protect the face and eyes of the operator, a cylindrical *drum sieve* is used. These are prepared by the Shakers; they consist of a leather-covered bottom and top, between which are two separate parts, one having a coarse wire sieve, and the other a fine hair sieve. The various parts fit into each other, and when in operation, the finest powder is received into the lower apartment, the next finest remains upon the fine sieve, and the coarsest rests upon the metal sieve; and, at the same time, the operator is not annoyed by the escape of any of the powder. A very excellent sieve for large operations, is *Harris's patent sieve.* (*See Am. Jour. Pharm. XXV., p.* 31.)

Trituration.—When it is desired to reduce powders, obtained as above, to a more uniform degree of fineness, they are subjected to trituration; this process is also adopted for the reduction of substances which could not otherwise be powdered, and for thoroughly mixing powders to form compounds. It is usually performed in a glass or wedgewood mortar. The left hand holds the mortar, while the right grasps the pestle and communicates to it a circular motion from the center to the circumference, and back again, alternating these motions so as to expose all parts of the article to the operation of the pestle; being careful, however, not to approach the pestle so near the circumference of the mortar as to throw out any of its contents. The circular motion must at the same time be accompanied with a degree of pressure sufficient to produce the desired result. In large operations, the mortar is made stationary, and the pestle is formed with a long handle, the upper part of which plays in an iron ring fastened at a proper height above, and over the center of the mortar, and which renders the operation less tedious and fatiguing.

Levigation.—This differs from trituration, only in the addition of water or alcohol to the powder operated upon, so as to form the whole mass into a kind of paste, which is rubbed until it be of sufficient smoothness or fineness.—*Coxe.* It is performed in flat mortars of glass, agate, wedgewood ware, etc., or on slabs of the same materials with plane surfaces, the operating face of the pestle or muller being also flat.

Elutriation.—This consists in adding a powder to a liquid which does not act upon it, as water or alcohol, for the purpose of separating the coarser from the finer particles. The liquid containing the powder, is well shaken, and is then allowed to stand for a length of time sufficient for the coarser particles to become deposited at the bottom of the vessel; the supernatant fluid containing the finer particles is then poured off, and these may be obtained by filtration, or by allowing them to subside.

Granulation.—This is employed for the mechanical division of some metals, as tin, zinc, etc. It is performed either by stirring the melted metal with an iron rod until it cools, or, by pouring it into water, and stirring it continually, as before, or, by pouring it into a covered box, previously well rubbed with chalk, and shaking it until the metal cools, when the rolling motion will be converted into a rattling one. The adhering chalk is then to be washed away.—*Coxe.*

The facility of pulverization will depend, in a great measure, upon the dryness of the article operated upon, for, the more moist the article the more difficulty will be experienced in reducing it to powder. Some articles require to be exposed to heat, from time to time during their pulverization, in order to free them from moisture which they have absorbed from the atmosphere. Resins and gum resins which become soft in summer, must be powdered in very cold weather, and must be beaten gently, or they will be converted into a paste instead of being powdered. Wood, roots, barks, horn, bone, ivory, etc., must be previously cut, split, chipped, or rasped. Fibrous woods and roots should be finely shaved after their bark is removed, for otherwise their powders will be full of hair-like filaments, which can scarcely be separated. Some substances will even require to be moistened with mucilage of tragacanth, as agaric, or of starch, and then dried before they can be powdered. Camphor may be conveniently powdered by the addition of a little alcohol, or almond oil. The emulsive seeds can not be reduced to powder, unless some dry powder be added to them. To aromatic oily substances, sugar is the best addition.—*Coxe.* Nux vomica, St. Ignatius' beans, and the tuberous roots of the orchis, being tough and horny, can hardly be powdered without a particular treatment. Nux Vomica, and St. Ignatius' bean, should be exposed to the action of steam, until they have swelled to about twice their original size, and then dried rapidly in the drying-room. The orchis-roots should be macerated in cold water until they are soft, and then dried as in the other case. After being thus treated they are easily powdered. Salts which are not easily reduced to powder by trituration, may be dissolved in water, and then the solution evaporated to dryness, keeping it constantly and actively agitated all the time, as sal ammoniac, salt of tartar, tartrate of potassa, etc. Some articles may be precipitated from a solution in fine powder. Some salts powder more readily after their water of crystallization has been driven off. Substances, the particles of which adhere when submitted to pressure, but which are not held together by a strong cohesive force, as magnesia and other similar substances, may be powdered by being merely rubbed over the surface of a sieve.—*Procter's Mohr and Redwood.* Damp materials, not containing a volatile principle dissipated by heat, should be well dried by artificial heat, and powdered in a warm, dry room. Many seeds, etc., require to be first ground in a mill, and then triturated. Phosphorus may be placed in a bottle containing alcohol, and heat applied until it melts; then by constant and active agitation until the fluid cools, the phosphorus will be obtained in a fine powder. Powdering is generally accompanied with some loss, but in no ways equal to that arising from drying.

SEPARATION OF SOLIDS FROM FLUIDS, ETC.

A solid may be removed from a fluid which does not act upon it, by filtration, or by allowing it to settle to the bottom of the vessel, and then removing the clear fluid by *decantation*, or by the use of a syphon. If the vessel containing the liquid be provided with a properly made lip, the decantation may be performed without spilling any of the liquid, and without disturbing the deposit. But decantation has to be performed with vessels of all kinds; and the process may be facilitated by holding a glass rod in a slightly inclined vertical position, the lower end of which is placed in the receiving vessel; the lip of the decanting jar is brought nearly or quite in contact with the upper part of this rod, upon which the fluid is poured. The adhesive attraction between the rod and the liquid prevents the latter from flowing in any other direction than along the rod into the receiver.

If the circumference of the vessel be so large as to render it impossible to pour with the guiding rod, which is very apt to be the case if its sides be perpendicular, with no lip present, and the fluid contained nearly filling it,—a little grease rubbed over the part of the vessel at which it is designed for the liquid to flow, will by preventing any adhesion of it to the surface of the vessel at that point, cause it to flow in a more cylindrical stream, and with less liability of overrunning the sides of the vessel.

Cases, however, occur where, from the character of the fluid, the shape or size of the vessel containing it, or from the disturbance occasioned to the precipitate upon motion, decantation is difficult or impossible; in such cases the syphon will effect the separation. The syphon is a tube bent so as to form two legs inclined toward each other at about the same angle as the two limbs of the letter V, being rounded however at the place where it is bent. One of the legs must be much shorter than its fellow. By filling the syphon with some of the liquid to be decanted, and then placing the short leg into the fluid, this will discharge itself from the end of the longer leg, and will continue to flow as long as this end of the tube is below the level of the liquid in which the other end is immersed.

Pipettes are instruments used for removing small quantities of liquid from the surface of precipitates or from places from which it would be difficult otherwise to remove them. A pipette is a slender glass tube with one end drawn to a very small point and capillary orifice, and at an inch or so from which a bulb is blown. The instrument may be straight, or it may be bent above the bulb at an oblique angle. To remove the liquid the small point of the instrument is carefully placed in contact with it, while with the mouth, or which is better, by means of a syringe attached to the upper part of the instrument, or by means of an India-rubber bottle attached to its upper end, suction is made and continued until the bulb is filled—this is then removed, and the process is to be continued until all the liquid has been removed. Pipettes may also be used for removing powders, insects, etc., from fluids, taking up urinary deposits, animalcules, microscopic crystals, etc. The forefinger of the hand in which the pipette is held is placed upon the upper end of the tube so as to close the upper orifice; the other end is then immersed in the liquid and brought into contact with, or as near as possible to the object, and the finger then removed from the upper end. Hydrostatic pressure then forces the liquid and with it the object, into the lower part of the tube, and, by replacing the finger upon the upper end of the tube, the object can be removed and transferred to any desired situation.

When it is desirable to separate liquids which are immiscible with each other, as water from oils, ether, or chloroform, etc., *separating funnels* or *separators* are employed, of which there are several varieties.

Filtration.—For the purpose of separating fluids from solids, or from insoluble impurities, filtration is employed, by which the fluid is caused to pass through the pores of certain media which are impervious to solids. Filters are prepared from various materials, and always of such as can not be chemically acted upon by the substances for which they are intended. "Fats, resins, wax, and oils, are strained through linen or cotton cloth spread evenly over a piece of wire-cloth or net stretched in a frame. For saccharine and mucilaginous liquors, fine flannel may be used; for some saline solutions, linen."—*Coxe.* Sand, powdered glass, powdered quartz, and asbestos, are used in filtering strong alkaline or acid solutions, which would exert a chemical action on organic filtering media. Animal charcoal is used where it is desired at the same time to remove the color or odor of the solution. For nearly all delicate operations, paper filters are used; alcoholic, ethereal, and chloroform tinctures, and many aqueous preparations are filtered through unsized paper made from cotton or linen rags. Paper from woolen rags being of coarser texture and more porous than the other, is used for filtering rapidly, and is often employed for syrups, some oils, etc. Solid fats, thick syrups, and oils, as well as fluids which deposit crystals on cooling, require the aid of heat during the filtration, in order that they may be kept hot. This is accomplished by the use of a water-bath funnel, or Dr. Hare's hot-filtering apparatus. Liquids which are affected by atmospheric action, or which evaporate readily, should have the filter in which they are placed covered with tin foil, or, a plate of glass may be luted to the top of the vessel containing the filter, by means of a mixture of wax and lard, rendering it air-tight. In order however, to keep up an atmospheric communication between the cavity of the funnel and that of the receiving bottle, which will always be necessary, a small piece of glass tube may be bent at a proper angle and placed between the filter and the funnel, the upper part extending to the top of the filter, and the lower extremity opening below the filter in the neck of the funnel or in the receiving bottle. To prevent it from sliding into the receiving bottle, it may be twisted near its lower end.

Expression.—In instances where it is required to remove fluids from solids as much as possible, as from the residue of tinctures, decoctions, etc., expression is employed, being, in pharmaceutical operations, usually accomplished by screw presses. The substance to be pressed is placed in a stout canvas or woolen bag, properly arranged under the press, and pressure gradually applied, increasing it slightly from time to time, till all the fluid is separated. In some instances, the solid is placed within the cavity of a sheet-iron cylinder, which is extensively perforated with small orifices, this is expressed by means of circular blocks of wood adapted to the internal diameter of the cylinder, and which are gradually forced downward upon the substance by the press, as in the preceding instance, the liquid flowing through the perforations into a sheet-iron or tin vessel placed under the cylinder, and from which it may be removed into other vessels, as often as necessary. When recent medicinal plants are to be expressed for the purpose of obtaining their juices, etc., they should first be beaten, ground, or bruised; and if they be somewhat dried, water or alcohol, according to the nature of the liquid to be obtained, should be added to moisten and soften them. Subacid fruits, when not too firm or large, may be placed in woolen bags without previous beating or contusion, these should be arranged under the press between a sheet-iron vessel beneath, and a stout block of wood above; the pressure should be gentle at first, increasing it gradually. Fruit having thick skins, as lemons, oranges, etc., must have them removed previous to expression. Seeds containing oil are first bruised or ground, then put into bags, upon which a powerful pressure is exerted. In the expression of many viscid substances, as butter of cacao, most solid and liquid fats, resins, and gum-resins, the employment of heat will be advantageous, and which is effected by means of hot iron plates. Many oils, however, are more apt to become rancid when thus obtained, and are consequently pressed in stout woolen bags, or in presses and apparatus made especially for the purpose, as in the case of almond oil, castor oil, etc.

Clarification.—When liquids contain foreign matters impairing their transparency, and which can not be removed by filtration, or precipitation and decantation, they are rendered clear by the process of clarification. This is usually accomplished by mixing with the cold liquid, white of egg well beaten with a little water, which on being heated, coagulates and rises to the surface, carrying with it all the impurities. The fluid may now be filtered or skimmed. Spirituous liquors are clarified without the assistance of heat, by means of isinglass dissolved in water, or of any albuminous fluid, as milk, which coagulates with the action of alcohol. In using albumen in the clarifying process, it must be remembered that it occasionally unites with some of the active principles of a liquid, and will separate them from the rest. Some expressed juices, as those of all the antiscorbutic plants, are instantly clarified by the addition of any vegetable acid.—*Coxe.* When expressed oils contain mucilage, they may be freed from it by adding them to water and boiling.

FLUID PREPARATIONS.

Medicines are frequently administered in the fluid form, being usually prepared either with water or alcohol; occasionally other liquids are used, as ether, chloroform, brandy, wine, vinegar, etc. The most common methods of obtaining fluid preparations are as follows:

Infusions.—Infusion is employed to extract the virtues of aromatic and volatile substances, which would be dissipated by decoction and destroyed by maceration; also to separate substances of easy solution from others which are less soluble. The process consists in pouring upon the solvend or substance to be infused, placed in a proper vessel, the menstruum or solvent, either hot or cold, as may be required, covering it up, agitating it frequently, and after a due time straining or decanting off the liquor, which is then termed the Infusion.—*Coxe.* As many articles yield their active principles to solvents, only at certain temperatures, infusions are prepared by maceration or digestion, according to the peculiarities of the solvend in this respect. *Maceration* is the subjecting solvends to the action of fluids at the ordinary temperature of the atmosphere, and continuing this action until the liquid employed has extracted the virtues of the substance infused, as in the case of tinctures, cold infusions, and medicated wines. *Digestion*, popularly termed "steeping," differs from maceration, only in exposing the infusion to an elevated heat ranging mostly from 100° to 150°, but occasionally as high as 200° F.

Decoctions.—Substances which are not volatile, and whose texture is so dense and compact as to resist the action of fluids when macerated or digested, are boiled in these liquids, and the strained liquor is called a Decoction. Most articles are impaired by boiling, and where decoction is required, care must be taken not to continue the heat for too long a time, as but few articles submitted to this process require more than five or ten minutes exposure to the boiling temperature.

Lixiviation.—When a body is composed of soluble and insoluble matter, which are held closely together, the soluble matter not readily yielding itself to a solvent, this is extracted by the process of lixiviation; which consists in passing the solvent slowly through the body which has been reduced to a coarsely powdered state, as in the familiar instance of procuring lye by lixiviating the ashes of wood. And this method may be used in nearly all cases where it is desired to separate the soluble from the insoluble materials, as in the preparation of tinctures, infusions, etc. The *method of displacement*, or percolation, is an improvement upon this process. It consists in reducing the article to be acted upon to a proper degree of fineness, then soaking it for a few hours with a sufficiency of the spirit to make it into a stiff pulp; it is then to be packed in a cylinder with the requisite degree of pressure, which can only be learned from experience, and the alcohol or spirit poured over it. The cylinder may be made of tin, twelve inches in length, two and a half inches in diameter, or fourteen by four, or seventeen by six; the lower part of this cylinder is made funnel-fashion, to the base of which a metallic plate pierced with holes is accurately fitted, and which, when in operation, should have a thin stratum of carded cotton laid over it, previous to placing in the powder.

The solution which first passes through is always in a state of high concentration, and should be set aside. The others are weaker, and may be evaporated to the proper strength, or mixed with the first portion, as required. In this process the liquid must be allowed to percolate slowly; if the powder be packed too closely, it will not flow at all; if too loosely, it will run through too rapidly. Some substances when moistened with a fluid become so tenacious as either to permit its too slow percolation, or prevent it altogether, as with guaiacum, myrrh, and other resinous bodies, gums, etc.; in such cases, the powder of these articles should be mixed with an equal quantity of coarse sand or pounded glass, previous to putting them into the displacer.

(For further and more detailed accounts of the various manipulations required in Pharmacy, the reader is referred to "*Mohr and Redwood's Practical Pharmacy, by Wm. Procter, Jr.*," a very valuable work which should be in the possession of every physician and druggist in the country; also, *Parish's* "*Introduction to Practical Pharmacy.*")

DISPENSING OF MEDICINES, OR EXTEMPORANEOUS PHARMACY.

A major portion of the apothecary's duties consists in dispensing medicines to supply the calls of his customers, either on their own account, or more generally in answer to the prescriptions of medical men. This is performed at the counter, either in view of the patient, or behind a screen, which prevents the latter from witnessing the dispenser's operations. Some druggists have a separate room for dispensing medicines, which is decidedly preferable to the screen. The object of these plans is, in the first place, that the operator may not be disturbed in his manipulations by the calls from others entering the shop, and in the second place, to avoid the innumerable queries of curious and suspicious persons relative to the prescription and its components. If he makes known the contents thereof he may offend the physician; if he hesitates in answering, or refuses to answer, he may offend his customer. The screen, but especially the dispensing room, prevents any of these unpleasant occurrences. To perform the office of an apothecary correctly, neatly, and expeditiously, one requires a thorough knowledge of his profession, united with a quick perception, sound judgment, firmness of resolution, physical agility, and an expertness at manipulating. In connection with these, cleanliness and urbanity are indispensable requisites. The apothecary who attends to the dispensing of medicines should never be found doing so in his shirt-sleeves; there is not a shadow of excuse for it, and no matter how warm the weather may be, a thin light coat should always be worn. Some apothecaries I have seen who lick the mouths of their bottles, after having poured the required quantities of fluid from them, or who, in helping themselves to syrups or other preparations kept in bottles, apply the mouth of the bottle to their own mouth, instead of pouring it into some proper vessel from which they could drink it; these are very disgusting habits, of which no properly bred person would be guilty, and which alone should be sufficient cause for a withdrawal of all public patronage. And if these are valid reasons for bestowing custom upon some more cleanly dispenser of medicines, what can be said of those individuals who scratch their heads, and blow their noses with their fingers, not only while in the act of preparing medicines, but even in sight of their patrons? A man of coarse mind, possessing none of the polish of refinement, and having no regard or care for the views or sentiments of others relative to the above points, is no more fit to dispense medicines than the most ignorant boor. Medicines are, in general, sufficiently repulsive, without having extra aversion added to them through disgusting and uncleanly habits, and the apothecary should so observe and regulate his actions as to win the confidence of the most fastidious individuals. A neat, cleanly and orderly store, a polite, attentive and cleanly apothecary or clerk, devoid of all offensive habits whatever, together with accuracy, neatness and dispatch in filling prescriptions, will always command the confidence and patronage of physicians, as well as patients.

In American practice, decoctions and infusions are seldom ordered in prescriptions; but where they do occur, the *infusion mug* of Mr. Alsop, of London, will be found one of the best instruments for facilitating the process. "Mr. Alsop has suggested a good method of preserving infusions, which might be very advantageously adopted by those who have not a sufficient demand for them to make it worth while to prepare them daily. The infusion is introduced into bottles provided with well-ground stoppers, and which are filled to the brim. If the infusion was not hot when put into the bottles, it must be subsequently made so by plunging the bottles into boiling water, and leaving them there for some minutes. The stoppers, which should be of rather a conical form, tapering downward, and smeared with a little wax, so that they may fit perfectly air-tight, and not become immovably fixed in the mouths of the bottles, are now to be inserted. In doing this, each stopper will displace a portion of the liquid from the mouth of the bottle, thus insuring the total absence of air. As the liquid cools, it will contract, and leave a vacuum in the upper part of the bottle. If the operation be carefully conducted, so as completely to exclude the air, the infusion will keep for weeks, or even for months, without undergoing any change. Mr. Alsop states that he has kept infusion of cusparia in this way for nine months, including the summer months, and at the end of that time it was in every respect as good as when first made. He suggests that the stopper of each bottle used for this purpose should be tied to the neck of the bottle, to prevent its being misplaced."—*Mohr and Redwood.*

Where fluid extracts of articles are kept, an infusion of any of them may be made by adding the requisite amount of the extract to a given quantity of water, and, if necessary, subjecting the infusion to rapid filtration. This will be found an expeditious and efficacious method.

It is frequently the case that medicated waters of an aromatic character, not ordinarily kept, are ordered; these may be readily prepared by rubbing together two drops of any essential oil with four or five grains of carbonate of magnesia for every fluidounce of water, adding the water gradually while rubbing, and then filtering. Camphor-water may be prepared by triturating it with magnesia, according to the formula given under Medicated Waters. Myrrh renders camphor more soluble in water, in the proportion of one part of the former to five of the latter. A camphor mixture, containing about three-fourths of a grain to the fluidounce, has been recommended; it is as follows: Take of tincture of camphor thirteen fluidrachms; tincture of myrrh, half a fluidrachm; alcohol, four fluidounces; mix. Of this add four fluidrachms to a pint of pure water. When spermaceti and ether are rubbed together, the latter more readily unites with water. Mixtures or emulsions after having been thoroughly triturated, should be strained to remove any coarse particles which may be present. The terebinthinate essential oils may be more readily made into an emulsion by adding a small quantity of fixed oil to them, or the yolk of egg may be added with advantage. The gum-resins may be rendered softer by trituration with camphor; carbonate of potassa is also said to saponify them, and render them more convenient for emulsions and pills, and more soluble in water, especially myrrh, ammoniac, sagapenum, and to some extent galbanum and assafetida. A little borax will often be found greatly to improve an emulsion. A little milk added to scammony facilitates its formation into an emulsion. M. Constantin recommends the following mode of preparing emulsions with gum-resins, the heat in which does not appreciably affect the substances acted upon. Place the gum-resin prescribed, in small pieces, in a marble or porcelain mortar, and add about four times its weight of alcohol. Then ignite the alcohol, and triturate the whole with a porcelain pestle until the alcohol has all burned away. The gum-resin acquires the appearance of a soft extract. Now add the liquid in small quantities at a time, and by trituration a perfectly homogenous emulsion is produced, from which no separation takes place on standing, and in which the gum-resin is very completely distributed. When the quantity of gum-resin is large, the addition of yolk of egg will improve the emulsion, by preventing reunion of the resinous portion. A small quantity of powdered gum Arabic might also be added to the gum-resin after the combustion of the alcohol has ceased, in order to render the emulsion more perfect. The resins afford results equally satisfactory. It is only necessary to add to them what they need to convert them into gum resins, and powdered gum Arabic answers this purpose. To the resin, balsam of tolu, for instance, twice its weight of gum Arabic is to be added, not forgetting the alcohol in the same quantity as before, the mode of operating being also the same as for gum-resins. Balsam of tolu may be thus perfectly suspended, forming an emulsion, the taste of which is very agreeable, and has nothing repugnant to the patient. Elaterium may be rendered more soluble in alcohol by the addition of a few drops of nitric acid, and it is best given combined with some syrup. It is recommended by Prof. Procter to add a little olive-oil to croton-oil, when this is to be added to a mucilage, in order to more equally and permanently diffuse it through the preparation. A few drops of alcohol will facilitate the reduction of camphor to powder.

All articles used by the apothecary, as mortars, graduating glasses, spatulas, pill or ointment slabs, etc., should be cleansed immediately after using them, being careful to wipe them perfectly dry. Fatty bodies, fixed oils, and resins, may be removed by alcohol, carbonate of potassa, or other alkali; carbonate of potassa will also remove prussiate of iron; metallic substances may be removed by the diluted mineral acids in which they are soluble. The aroma from musk, volatile oils, etc., may be destroyed by exposing or rubbing the vessel or instrument with those agents from which hydrocyanic acid is procured, as peach meats or leaves, bitter almonds, etc. If resins or fats are present, these must previously be removed by their appropriate solvents. The dispensing scales should constantly be kept clean, and in some place not exposed to the dust, as, for instance, in a glass case, and they should frequently be examined to ascertain whether they continue properly adjusted. Scales adjusted to weighing grains and parts of an ounce, are easily rendered inaccurate by being placed in situations where they are exposed to much jarring, or frequent unnecessary handling; the apothecary will do well to observe this statement, and act in accordance with it. For numerous other points connected herewith, the druggist is referred to the works named in the preceding article.

In some parts of this country, it is not uncommon for the dispensing office to contain one or more idlers or loungers, during a portion of every day, who, from their continual staring at lady-customers, as well as their tobacco-spitting and smoking, drive the respectable portion of patrons to other shops; these are more generally the associates of the assistants or clerks, who, without intending offense frequently offend very seriously. A proper course should be adopted in relation to this class of visitors.

COMPOSITION OF VEGETABLES, AND THEIR PROXIMATE PRINCIPLES AND PROGRESS IN PHARMACY.

BY W. S. MERRELL, A. M.

The Vegetable Kingdom is the great source from which all animal life derives its nutriment in health, and for the most part its medicine in disease. All vegetable matter is composed of a very few *elementary substances*—carbon, hydrogen, oxygen, and nitrogen, constitute nineteen-twentieths of all the innumerable variety of the vegetable world. The small quantity of silex, potassa, soda, lime, iron, etc., which compose the ashes after combustion, constitute the rest. But these few *primary principles* enter into a great variety of definite combinations, which form distinct organized substances, which we term *proximate principles*. These, although composed of the same primary elements, yet, in consequence of the different proportions of them, and the different arrangements of their particles, possess properties altogether peculiar and different from each other.

Of these proximate principles of vegetable matter, the most abundant is the Lignin, or Woody Fiber, which constitutes the framework, and, as it were, the bones of all vegetation. It is insoluble in all ordinary menstrua, and is that portion of a plant which is left after having been fully digested in water, alcohol, ether, or dilute acids. It is, therefore, considered inert, and as possessing neither nutritive nor medicinal properties.

Next in abundance, and first in importance in the constituents of plants, are those proximate principles which are capable of being *digested* or changed by the action of the gastric fluids, and which are thereby *assimilated* to the principles of the animal organism, and thus nourish and sustain animal life. Such are starch, gum, mucilage, sugar, fixed oil, vegetable albumen, gluten, and a few others analogous to these. All vegetables in which these constitute a large proportion unmixed with other constituents that are deleterious, are useful for the food of man and animals.

But, beside these, there are a great number of other organized compounds or proximate principles found in the vegetable kingdom, which are incapable of being so assimilated, and, therefore, afford no nourishment to the animal tissues, but which, nevertheless, when taken into the system, or applied upon its surface, change, or in some way affect the action of the animal functions. Many of these, if taken in considerable quantities, derange, and even destroy the healthy action of those functions, and are thus regarded as *poisons;* yet, when those functions are deranged by disease, they serve, when administered in appropriate doses, to arrest such morbid action, and to restore such functions to their normal condition, and thus they become important medicines. It is the study of the nature of these substances, and their proper application to the preservation or restoration of health, that constitutes the high calling of the physician; and the proper mode of preparing and dispensing them, constitutes the scarcely less important avocation of the pharmaceutist and the apothecary.

In their earlier application to the healing art, those vegetables which contained medicinal properties were either administered in substance, in the form of powder, in which case all the woody fiber and other inert elements were thrown together into the stomach, often in large and repulsive doses, or else their more soluble principles were extracted by infusion or decoction, and given in copious and nauseating draughts.

The first of these forms is now seldom eligible, except for administering those vegetable products which nature herself has presented in a high degree of concentration, or of those whose medicinal principles are so very active, that the bulk thus required is not objectionable; and the latter may now be dispensed with, except in cases where it is desirable to present the medicine to the stomach very much diluted, or where the indications to be fulfilled make it expedient to accompany it with large draughts of hot or tepid fluids.

It was one step in progress, from these forms, to dissolve out the medicinal principles of plants or roots by Wine or Spirits, and present them in the form of medicinal tinctures. This was, in many cases, an improvement on the watery infusion or decoction, because such tincture could be preserved for some time unchanged, and thus be kept ready prepared for immediate use, but chiefly, because alcohol is an almost universal solvent of the medicinal proximate principles, many of which are scarcely soluble in aqueous fluids, and are, therefore, not extracted by such menstruums. But in many cases, even this form of dispensing medicine is very objectionable, on account of the large proportion of alcoholic stimulus with which the medicinal principles are thus combined, and which renders them almost inadmissible in diseases of an inflammatory type. Of such a character are many of the numerous officinal tinctures still found in the pharmacopœia of the so-called regular practice. A few preparations of this kind may be still properly retained in the Materia Medica, but it should be only those of the more powerful medicines of which the dose is sufficiently small, and these should be, mostly, saturated tinctures, containing as much of the medicinal principle of the substance as the menstruum will hold in solution. (*See Art. Tinctures.*)

Another improvement on the crude administration of vegetable medicines was the formation of Aqueous Extracts, by dissolving out all the constituents of a plant that are soluble in boiling water, and then evaporating off the liquid until the exhausted matter was of a suitable consistence to be formed into pills. By this means, the bulky and inert lignin is dispensed with, and the medicinal agents presented in a form and bulk somewhat less objectionable. This is still an eligible form of presenting many valuable medicines. (*See Art. Extracts.*) But in most cases, it is liable to several objections, as, when the active principle is of a resinous or oleaginous character, it is very imperfectly soluble in water, and, therefore, the aqueous extracts of vegetables containing such principles are comparatively worthless, from the fact that the real active agent is still left behind in the refuse; again, if the medicinal principle is volatile, as it is in many instances, then it is dissipated and lost in the process. In other cases the active principle is of so delicate a nature as to be chemically decomposed and destroyed by the continuous action of the hot water necessary to the process. This is the case with the arum, sarsaparilla, stillingia, and many other most valuable remedies. Moreover, in this process, the starch, gum, mucilage, coloring matter, and all the other non-medicinal principles are extracted, as well as the medicinal, and as we do not know what proportion the latter bear to the former, in different specimens of the plant, the extract may appear well, and yet be almost inert

The next great step, therefore, in the progress of pharmacy was to unite the principles of these two improvements, and form the Alcoholic Extracts. Alcohol, as before observed, is an almost universal solvent of those proximate principles of vegetables on which their medical virtues depend. I know of no principle of such activity as to deserve the name of medical, which, in its native combination, is not dissolved by this agent, either pure, or when diluted to the strength of proof-spirit. The alkaloids, resins, essential and fixed oils, acids, salts, and neutral principles, all, as they are found in their native combinations, are soluble in these menstrua; while, on the other hand, the non-medicinal principles, as starch and gum, which, next to the lignin, are the most abundant elements in most vegetables, are quite insoluble in pure alcohol, and but partially soluble in dilute. By obtaining, therefore, an alcoholic or hydro-alcoholic tincture, either by digestion or displacement, and then distilling off the alcohol, and carefully reducing the residue to a pilular consistence, an extract is obtained, which, in the first place, fully contains all the medicinal principles of the substance in their native proportions, and, in the second place, is diluted by but a small proportion of those non-medicinal substances which abound in the watery preparations. These extracts, moreover, will generally keep unchanged, while those obtained by water, and especially the inspissated juices, which are the best preparations of that class, are liable to mold, or become otherwise decomposed.

Another important form of the alcoholic extract, and one that is justly becoming very popular, is that in which the concentration of the tincture is not carried to the pilular consistence, but is left in a fluid or semi-fluid state, and preserved from decomposition by the little alcohol in it, or by the addition of a sufficient quantity of sugar or other antiseptic. These are called Fluid Extracts, and will be referred to again when the cases in which they should be preferred, and their peculiar advantages, will be noticed. (*See Fluid Extracts.*)

Almost every article of the vegetable Materia Medica, might properly be prepared and presented in the form of alcoholic or hydro-alcoholic extracts, either inspissated or fluid; for even where the active principle of a plant has been fully isolated, these preparations will often be found convenient. Still they are not perfect pharmaceutical preparations, for even alcohol dissolves the sugar, coloring matter, and other inert principles of vegetables with which the real medicine is combined, and as these are not uniform in their proportions, but vary according to the season of gathering and other circumstances, such extracts are not, therefore, definite and uniform in their strength, even when made with the greatest care. And a source of still greater disappointment is their ever-varying quality, according to the *skill* and *honesty* of those who prepare them, and their strength is subject to no convenient test but that of actual demonstration. Therefore, when employed, those only should be relied on, which are made by pharmaceutists of acknowledged skill and integrity.

But another step has been taken: these objections are obviated, and pharmacy placed among the exact sciences of the age. This consists in separating that proximate principle—that peculiar organized substance on which the medicinal virtues of a plant depends—from all the other substances with which it is combined, and thus presenting the very medicine itself, in a pure isolate state.

One great advantage of this improvement is the smallness of the bulk to which medicines are thus reduced. Of these preparations the physician can carry in his pocket an assortment, which once required a horse-load, and can administer in a single pill or delicate powder, a dose, at which, in its cruder forms, the stomach revolted. But it has another and even more important advantage than this, and that is the *definiteness* with which the medicine so prepared can be apportioned.

In every other form in which vegetable medicines can be presented, their strength, as has been observed, is constantly subject to variation, and the physician is not only often in doubt what doses to prescribe, but is frequently at a loss whether to attribute his failure in obtaining the desired result, to the inertness of the medicine, or to his misjudgment in selecting the proper agent. Thus, for example, two samples of Peruvian Bark, or the ordinary tinctures or extracts obtained, may appear equally fair, and both be unadulterated, and yet one contain ten times the medicinal virtue of the other. But with regard to the proximate principles, this does not occur; the physician who prescribes one grain of quinia, knows just how much of the real medicinal substance he is administering, and it matters not whether it required twenty or two hundred grains of the bark to yield that amount,—itself, is definite and invariably of the same strength. In relation to these principles, the only question is, are they *pure?* And being definite chemical substances, their purity may in most cases be easily tested.

These *proximate principles* are divided into several general classes, distinguished by their general characteristics and reactions with other substances. These are the Acids, Fixed Oils, Essential Oils, Resins, Resinoids, and the Alkaloids, and perhaps a few others that can not properly be classed with either of these.

Every medical plant, as has been before intimated, contains one or more of these principles, on which all its virtues as a medicine depend; and all the skill of the enlightened pharmaceutist is now called into requisition to separate these from their native combinations, and present them in their purest and most eligible forms.

Acids are, in general, readily recognized as those substances which give a sensation of sourness to the taste; but the term is chemically applied to all substances which redden vegetable blues, are electro-negative in relation to other principles, and combine with alkalies to form neutral compounds. The acidity of certain fruits, and other parts of vegetables must ever have been noticed, but it is of comparatively modern date that the different vegetable acids were distinguished from each other. We now recognize the *Malic*, *Citric*, *Tartaric* and *Oxalic* acids, as existing abundantly in fruits, etc., either pure, or combined with potassa in form of bi-salts, or those in which the acid predominates. In general, they are isolated from their native combinations by saturating them with an alkali or metallic oxide, and in this state, separating them by precipitation or crystallization, and then decomposing such neutral compound, and removing the alkaline or earthy base, by the superior affinity of some stronger acid, generally the sulphuric. After which, excepting the malic, they may be further purified by repeated crystallization.

These acids are used, in their uncombined state, to form cooling and febrifuge draughts, also as antiscorbutics, and in combination they form valuable hydragogue aperients. Beside these four vegetable acids, which are so manifestly distinguished by their sourness, there are several other electro-negative principles found in certain vegetables, as the benzoic, tannic, gallic, and other acids, all possessed of peculiar and valuable medical qualities;—and by natural decay and destructive decomposition, an almost indefinite number of similar organic substances are found, capable of uniting with alkaline bases, and forming an endless variety of neutral compounds. But few of these have yet been examined, with reference to their medicinal action, and, therefore, with the exception of the well-known article, vinegar, which is formed by the combination of oxygen with liquids that have undergone the vinous fermentation, they form no part of the Materia Medica.

The Fixed Oils too were obtained and used in medicine at an early period. They are analogous to the acids in being electro-negative, and as such, they combine with alkalies, and form compounds called Soaps. They are obtained in abundance from many seeds and fruits by simple grinding and expression; but most of them, as of the olive and linseed, possess feeble medicinal powers, and are useful for food and in the arts, rather than as sanative agents. Indeed, it is probable that the medicinal virtues of most of the expressed oils depend, not on the oil itself, but on other peculiar principles held in solution by it, the same as the peculiar flavor and medical qualities of different kinds of spirits, as rum, brandy, gin, etc., depend not on any singularity of the alcohol itself, but on certain volatile oils dissolved in it. In some cases at least, as in that of mustard, the fixed oil may be obtained, by expression, bland and almost tasteless, while the more active principle is left behind, and may be afterward obtained by other means. A few of the expressed oils, however, as those of ricinus and croton tiglium, are powerful and valuable articles of the Materia Medica.

The Essential Oils constitute another important class of proximate medical principles. These differ from the fixed or expressed oils in being volatile without decomposition, and in being, for the most part, warm and pungent to the taste, and powerfully stimulant in their medicinal character. As the process of separating them from other substances is simple, many of them were long since discovered and prepared. They are mostly procured by the simple process of distillation; the plant, or the part of it containing the oil—usually in its recent state—is put into a large still, with a portion of water, and by converting the latter into steam, the volatile oil of the plant is carried over in vapor with it, and is condensed by passing through a suitable worm or condenser of other form. The oil separates from the water, for which it has no chemical affinity, and either floats or sinks, according as its specific gravity is greater or less than the water, and is thus easily separated.

In this manner are obtained the oils of mint, sassafras, cloves, etc., and with a few exceptions, all others of a valuable character. Gum camphor, so called, belongs to this class of medicines, being only an essential oil in a concrete or congealed state, at ordinary temperature; and several others, as those of the anise and the rose, assume this concrete form when the temperature is only moderately reduced. Several medicines of this class are used, and highly esteemed, in American practice, which are yet wholly unknown to the old pharmacopœias, among which are the oils of Erigeron Canadense and Erechthites Hieracifolius.

From these oils we pass, by an easy transition, to another class of the proximate principles, viz.: the RESINS, many of which appear to be formed from the volatile oils by the absorption of oxygen, which renders them fixed and concrete. Thus, the purest *Camphene*, or oil of turpentine, by exposure to the air, combines with its oxygen, and is gradually changed into a diminished quantity of common rosin; and almost all essential oils become thickened and resinous by long standing, unless entirely excluded from the air.

The pure *resins*, and many *gums* with which they are compounded, were early found and recognised as dried exudations from certain trees. Their distinguishing characteristics are: their fusibility by heat, great inflammability, insolubility in water, solubility in alcohol or essential oils, and their capability of combining with alkalies, forming saponaceous compounds. The resins (or so called gums) of the various species of pine, spruce, and larch are of this character.

The *Gums*, properly so called, are distinguished by the opposite characteristics, not being fusible by heat, not readily inflammable, not soluble in pure alcohol, but soluble in water, forming a viscid fluid called mucilage; such are the gums of acacia, prunus, amygdalus persica, etc. These are articles of diet rather than medicine, and are used in pharmacy only as demulcents and vehicles to shield the action of more active agents.

There are, however, an intermediate class of articles called Gum-Resins, partaking in part, of the properties of each of the above, and which are active and important articles of the Materia Medica; such are the gum myrrh, assafetida, ammoniac, and gamboge; but of these, the resinous portion is the medicinal one, for alcohol, which dissolves the resin and leaves the true gum, holds in solution all their medical virtues.

But there is another class of resinous substances, less abundant than those which exude from the trees that contain them, and which possess medical virtues of a much higher degree. They exist in roots, and, in some cases, other parts of numerous plants, but combined with such large proportions of woody fiber and other principles, that they can be separated only by chemical agency. These possess, in general, the properties of the common resin, viz: fusibility, inflammability, solubility in alcohol, and not in water, etc., but as they are not fully liquifiable by heat, and differ somewhat in other respects from the pure resins, we term them *Resinoids.*

Many of them may be obtained by the following simple process; form a saturated tincture of the root or plant desired, which is best done by displacement, or leaching alcohol through the ground material. From this tincture, distill or evaporate off the alcohol, having previously added plenty of water; the alcohol, which held the resin in solution, being thus removed, and the resin not being soluble in water, it is precipitated, while the other substances which the alcohol had dissolved out, as the extractive and coloring matter, being also soluble in water, are held in solution by the water and thus separated from the resinoid. The precipitate is then collected and purified by frequent washing, or by being redissolved in alcohol, and again precipitated—and is then dried and powdered for use. Thus may be obtained the resins of podophyllum, cimicifuga, leptandra, etc.

By this process alone, the resinoid is not obtained in its chemically pure state: it probably still contains from two to five per cent. of coloring and extractive matter, which, however, does not sensibly affect its use as a medicine; while a further purification would not only add to its cost, but might even endanger its activity. Its complete purification must be effected by redissolving it in alcohol, digesting the solution with animal charcoal, then filter, and again precipitate by water.

In some analyses, the resin has been separated by boiling the substance in milk of lime, or some other alkali, by which the resin is separated and rendered soluble, and from which solution it is precipitated by neutralizing the alkali with an acid. By this means the resinoid is obtained very cheaply, and very fair in appearance, but its medical property is nearly or quite destroyed. It is, indeed, no longer the resinoid, but probably bears the same relation to it that stearic acid, which has passed through the same process, does to stearin, and the precipitate thus obtained from podophyllum is not podophyllin but podophyl-*linic* acid. The process is an eligible one for scientific analysis, for as the stearic acid obtained is a correct indication of the amount of stearin contained in a given quantity of fat, so would this acidified resin be of the true resin or resinoid in a given quantity of the root. This was the process pursued by Mr. Wm. Hodgson of Philadelphia, in his analysis of podophyllum, as published by him; but the process is entirely inapplicable in pharmacy, as the product is worthless. Mr. Hodgson did not obtain podophyllin, but podophyllinic acid.

The introduction of these and analogous preparations into the Materia Medica, which is of very recent date, constitutes an era in medical practice, especially in that of the American schools of medicine. The distinguished and lamented Prof. T. V. Morrow, pronounced the discovery of the podophyllin alone, the greatest improvement in pharmacy that had been made for the last thirty years.

Until within the present century, the science of vegetable analysis was unknown; and within the last few years, the researches of chemists in this field had shown that many vegetables contained, among other proximate principles, those of a resinous or resinoid character; but, for the most part, such discoveries lay as dead and useless facts in the records of science, without being applied to any practicable use. Nor was it even ascertained, in most cases, that such resins contained any medical power, much less that they were the depositories of the principal, if not the whole medical virtues of the plants that contained them. To this there were a few exceptions; the resin of jalap was known to the profession, and used as an active medicine. Professor Tully, of New Haven, Connecticut, had obtained the resin of cimicifuga, and perhaps of some others, and recommended them to the attention of his medical brethren;* but it is not known that any other one ever prepared or used it. Professor John King, the author of the present volume, first discovered and separated the resins of the podophyllum, cimicifuga, iris, and several other roots, and used them successfully in his own practice for a series of years; and as early as July, 1844, in the "New York Medical Philosophical Journal," and again in April, 1846, in the "Western Medical Reformer," he introduced and recommended them to the American Medical profession, as valuable agents in several forms of disease; but these discoveries and recommendations had passed unheeded, and were unapplied, chiefly, it is presumed, because other practitioners could not devote the time and skill necessary to their preparation, and because no pharmaceutist had undertaken their manufacture. But in the summer of 1848, the writer of this article separated them, with several others of his own discovering, and having the advantage of being engaged in the *sale* instead of the *administration* of medicines, immediately put them up in a neat and eligible form, and thus directly presented them to the notice of the profession.

Since that time their sale and use have increased with an unexampled rapidity, which shows how high an estimate is placed on them. To the American branch of the profession belongs the honor of first discovering, testing and adopting them. Physicians of the Physo-medical school soon followed in the use of them, and their pharmaceutists in their preparation and sale. And at the present time, hundreds of physicians of the various medical schools are testing and adopting them.

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* I am not aware that Prof. Tully ever obtained this resin, though he mentioned its existence to me.—*J. K.*

The names applied to these resinoids, by the writer of this, on presenting them to the profession, have now become generally adopted, and which are formed by changing the termination of the generic name of the plant into *in*, after the analogy of Res*in*, or Ros*in;* thus, from Podophyllum, we have Podophyllin; from Leptandra, Leptandrin, etc.

The most important of these Resinoids, when properly prepared, are dry and pulverizable, and are prepared for the profession in that form; but a larger proportion of this class of principles possess so much of an oleaginous character, or the resin is so combined with a fixed oil, that they can not be reduced to the powdered state without injuring, if not destroying them. These we denominate *Oleo-resins*, and they are of all degrees of consistence, from the almost perfect fluid of the Ptelein, to the buttery spissitude of the Xanthoxylin, and the tough, gummy compactness of the Cypripedin and Asclepidin. But they all belong to the same general class of proximate principles, and are obtained precisely in the same manner as the dry resinoids above described. And they are less popular and less used than the powdered resinoids, because they can not be so conveniently combined with other medicine, and are not so easily administered as the dry. But they possess all the advantages of great concentration of medical power, and of perfect definiteness of strength, which is the distinguishing character of the pure proximate principles.

There is one class more of these medical principles, which deserves our special notice, and which, together with the resinoids just noticed, forms the acme of improvement in scientific pharmacy. This is the *Alkaloids.*

The Resinoids are electro-negative substances; the Alkaloids, electro-positive; those combine with alkalies and form saponaceous compounds,—these combine with acids and form salts;—those are mostly colored and opaque—these mostly white and crystalline. The great pioneers in this branch of pharmacy were Pelletier and Caventou, of France, who perfected the discovery of Morphia, Cinchonia, and Quinia, and who were the first to clearly define the chemical character of these agents, in about 1820. I say, *perfected the discovery*, for like every great improvement in art or science, there were previous discoveries approximating to the result.

The Alkaloids do not generally exist in vegetables in their pure state, but in the form of salts produced by their combination with some peculiar acid. Thus, morphia is found in opium combined with meconic acid, forming meconate of morphia, and quinia exists in the barks combined with kinic acid, forming a kinate of quinia. These native salts are in a greater or less degree soluble in water; but the pure alkaloids are very sparingly soluble in that menstruum, although soluble in hot, and most of them in cold alcohol. But as the processes of separating and purifying them are various and complicated, and are abundantly described in different works on the subject, the student is referred to them for that instruction. By these and similar processes, those substances which were once considered as homogeneous, have been analyzed, and made to yield those principles on which their virtues depend, pure and isolated. And those agents which are provided for the healing of our infirmities, are presented in doses, small, definite, and less repulsive.

But while we refer with pride to the work which has already been accomplished, we must not forget that the field has, as yet, been just entered. A vast expanse is yet to be explored. Not one-tenth of the articles of the Materia Medica have yet been analyzed, and in most of these even, the examination has been partial and imperfect. The physician, however, should not rest satisfied, nor the pharmaceutist stay his hand, until, as in the mineral, so in the vegetable kingdom, every known substance should be made to yield both its elementary and its proximate principles, separate and isolated; and the action of the latter on the animal economy, should be tested and made known.

N. B.—It is but justice to state here that, as early as 1847, while engaged in lecturing before the class of the Worcester Medical College, Mass., Prof. J. Kost exhibited to those in attendance no less than ten or twelve of our (at present) leading resinoids, among which was what he called "precipitated extract of podophyllum," now termed "podophyllin"; and which resinoids were the results solely of his own investigations, he not being aware that any other persons had at that time been directing their attention to extracting the active principles of the indigenous remedies of our Reformed Materia Medica. Although in the extraction of some of these agents he may have been anticipated by others, yet much credit is due Prof. Kost for his labors and investigations in this direction, and to him undoubtedly belongs the honor of having been among the first to isolate the active principles of several of our valuable plants, as well as for having labored for a number of years to impress the fact upon the profession, that the therapeutical influences of all medicinal plants were owing to certain active principles, independent of their woody fiber, starch, chlorophyll, and other inert constituents, and that, in most cases, these principles could be separated by certain chemical processes.—*J. K.*

PREPARATION OF MEDICINAL EXTRACTS.

B. H. TILDEN.

This department of Pharmacy is one of deep and increasing interest to the medical profession, and has occupied much of the attention of scientific and practical Pharmaceutists; it embraces within its range, the entire vegetable kingdom, those plants whose powers and properties are determined and understood, as well as those undeveloped and undergoing investigation; its limit is only with the researches of the human mind for sources of relief to the human race; its benefits depend upon the practical application of well established laws of Chemistry.

The preparation of Medicinal Extracts may for convenience be considered under two divisions: 1. The production of the solution of the soluble portions of the substances operated on. 2d. The reduction of this solution by evaporation to the consistence of an extract.

In the production of the solution we must bear in mind that we are often treating articles of a complex and delicate nature, our aim being the active principle isolated from the inert matter as far as possible; it is, therefore, necessary that the menstruum and mode of manipulation be suited to the peculiar characteristics and active constituents of the substance under treatment; to be ascertained by a careful analysis of the substance; and that the extract shall represent in medicinal efficacy the material from which it has been produced; the evaporation must be conducted in the most careful manner till the required consistence is obtained. *Evaporation in vacuo* affords the most perfect means of preservation.

Our investigations into all the principles involved in the preparation of medicinal extracts, and the various plans in use in England, France, and Germany, such as evaporation over a naked fire—sand and vapor-bath—solar heat, and with currents of dry air, convinced us that they were all objectionable inasmuch as the high temperature and oxidizing effect of the atmosphere were fatal to the delicate principles involved, and we decided upon the use of the vacuum evaporation exclusively, somewhat analogous to that used in refining sugar. Accordingly, in 1848, we erected our apparatus which has since undergone such alterations and modifications as experience has suggested, adapting it to the business up to the present period. We believe we have the most complete and extensive apparatus in existence, devoted to this business.

The apparatus consists of several air-tight evaporators, from which the air is exhausted by an air-pump kept in constant operation by a steam-engine, the exhaust steam of which is used to keep the temperature of the material within 100° F. The advantage of this mode of evaporation is, that the solution may be evaporated rapidly, not only out of contact with the atmosphere so that its principles can not undergo oxidation; but also that at the low temperature of 100° F., the intimate chemical changes that usually occur at high temperatures are not observable, and the preparation retains the *odor*, *color*, and characteristics of the plant. Most vegetable substances are very delicate and are easily injured by heat, particularly the narcotics, causing a conversion of fixed soluble principles into insoluble and therefore inert compounds.

Pilular Extracts.—It has long been an important desideratum in medicine how to obtain these in their greatest purity and concentration. The form of the solid or pilular extract being the simplest form of concentration, as well as the most convenient for administration, because it is the one most employed in all investigations of new remedies. These are usually made with water, alcohol, diluted alcohol, ether, acetic acid, or by expressing the juice of the plant; and should represent the infusion, decoction, tincture, or juice (by the evaporation of which they are obtained), in all respects except *degree* of concentration.

In forming the solutions to be evaporated it is important that the most advantageous solvent be selected, or, when necessary, a *combination* ot several, or a succession of different solvents be employed; our experience has convinced us that alcohol of various degrees of strength should be used instead of water, as the action of water upon the active principle ot most vegetables, is feeble, while it dissolves agents, such as starch, gum, and extractive, which *increase* the *bulk* of the extract and *lessen* their *activity*. The volatile portions, essential oils, and the aroma, should be nearly or wholly preserved; although they do not always form the principal active ingredient, they exercise a modifying, if not controlling influence over the other principles of the plant. All substances treated should be known to be in a proper state for use, and to *fully* carry out the general plan, we have adopted the plan of exclusive cultivation of many varieties which it was difficult to obtain in sufficient quantity and of proper quality, particularly the narcotics, as Conium, Belladonna, Hyoscyamus, Stramonium, Digitalis, and Lettuce, all of these being limited to a certain state or condition of growth for manufacturing. They are used in the green state, the plant being first ground to a pulp, the juice then expressed and clarified, and the pulp subjected to the action of alcohol.

Ordinary inspissated extracts are not very reliable, because the expressed juice does not contain the entire constituents, much being left in the pulp which is thrown away.

In making this class of extracts the practice is frequently adopted of reserving the chlorophyll or green-coloring matter which separates on first heating the expressed juice, keeping it, and when the extract is nearly concentrated mixing it with the extract to impart a green color, this being usually considered the test of good quality: it will readily be perceived that this test is not infallible, and that a worthless extract *may* have a fine green appearance. It has been a subject of considerable discussion whether the chlorophyll should be retained or not. Our conclusion is, that it should be taken out by clarification; it possesses no medicinal activity whatever, only increases the bulk of the extracts, and renders them more liable to decomposition, and is frequently the sole cause of moldy extracts.

The cultivation of plants involve really as much science as their subsequent manipulation. Organic chemistry has thrown much light upon this subject. By an analysis of the *plant*, and of the *soil* upon which it is proposed to grow it, we determine the nutriment necessary to its perfect development. The variations of climate, character of seasons, either hot or cold, wet or dry, have a controlling influence upon the development of plants, and in no other way can we account for the variations which often occur in the medicinal power of preparations of different years, the manipulations each year having been conducted alike; these circumstances are beyond the control of the manipulator and can be modified but partially.

Fluid Extracts.—This class of extracts are becoming more popular with the profession, as they become more acquainted with them and the principles of their preparation. They are found to be definite in strength, efficient in action, and very convenient in administration. They vary from the *solid* or *pilular* extracts only in the *degree* of concentration, having this advantage, viz.: the evaporation not being carried *so far* as with the pilular extract, the active principle is less liable to injury by heat. The general principles of manipulation are the same, and inasmuch as each fluidounce is required to represent one ounce of the crude material, their uniform medical power depends upon a methodical extraction of the active principles, which may be either an acid, resinoid, or essential oil, etc. Separate or combined, these elements must be held in solution, so as to form a clear preparation, and, to prevent decomposition, should contain either sugar or alcohol.

Some difference of opinion exists as to the propriety of using any sugar in their preparation, or any adjuvants, increasing the amount of alcohol as the antiseptic. We do not think an arbitrary rule in this respect proper or safe, the characteristics of each article should govern this. It is the duty of the manufacturing pharmaceutist to prepare these articles in sufficient variety to meet, as nearly as possible, the wants of the physician, and avoid the necessity of adding articles to them which are of difficult procuration, and the proper proportions of which he can not be expected to fully understand, as well as the necessity of compounding the varieties. All these preparations should represent the crude material in a form at once ready for administration, and as palatable as the skill of the manufacturer can make them. It is a fact worthy of attention, frequently mentioned to us, that Dandelion and Senna, Rhubarb and Senna, are much more efficient when prepared as compounds, than when the simple preparations are *mixed* to form the compound.

The advantage of fluid extracts is, that there is a uniformity of strength, a *reliability* and *certainty* of effect in a short time, which enables the physician to regulate the dose accordingly. From them he can form his syrups at once, and with a cleanliness and ease that is surprising to one accustomed to the use of crude articles or powders. They are designed, and with the concurrence of the profession are destined to work a revolution in the nostrums of the day. They are articles of reliable characters, which the physician and apothecary are safe in recommending as domestic remedies.

Extract of Liquorice.—We prepare this article from the imported root; it has a brown appearance, represents the root in *color* and *taste.* The ordinary or commercial extract is of a *black* appearance, with a *burnt, bitterish* taste, and does not possess in any degree the peculiar flavor or properties of the root, both being destroyed by the high temperature employed in its manufacture. Much of the foreign extract is adulterated by boiling with the root, shrubs of the country, and its adulteration in this country with starch, flour, and other articles, render it unfit for use. As the liquorice root is one of the most valuable expectorants known, it is a matter of the first importance that the extract should faithfully represent the curative properties of the root.

ACETA.

Vinegars.

These are officinal liquid medicines, formed of Vinegar, and charged by maceration with different medicinal principles. Many medicines contain active principles which are not readily taken up by water or alcohol, or are, perhaps, insoluble in them, but which are freely soluble in Vinegar; others again, although soluble in water or alcohol, are not as efficient and energetic thus prepared, as when tinctured in Vinegar; on this account, *medicated Vinegars* are especially useful in many instances. The Vinegar of commerce is very apt to contain impurities and elements which lead to its decomposition, hence, when used as a solvent for pharmaceutical purposes, distilled Vinegar should be preferred. The solvent property of Vinegar chiefly depends upon its acetic acid, which renders it more especially valuable in the preparation of those agents which are soluble in this acid, or which are rendered more soluble by being converted into acetates. Medicated Vinegars are not permanent preparations; and to prevent their spoiling too rapidly, a small proportion of alcohol is usually added to them. It is better to prepare this class of compounds, only as they are required. Mr. W. S. Merrell states "that in the Vinegars of lobelia, and sanguinaria (or where the color of the preparation is necessarily dark), good cider or wine Vinegar is to be preferred to distilled Vinegar; and in these preparations the alcohol necessary for their preservation should be *first* added to the powdered ingredients so as to aid in dissolving their oily and resinous principles, and then displaced or expressed with the Vinegar. When a pure Vinegar is desirable, the acetic acid of the shops diluted with six parts of pure water, forms a more definite, and therefore, more eligible preparation than the Acetum Destillatum."

ACETUM DESTILLATUM. *Distilled Vinegar.*

Preparation.—Take of Vinegar *eight parts,* place in a glass or silver retort, and distill over into a receiver of similar material *seven parts.* Dilute the product, if necessary, with distilled water, till the specific gravity is 1.005.—*Ed.*

Distilled Vinegar is recommended to be prepared from wine Vinegar, chiefly on account of its aroma; and it should be prepared in glass or silver vessels, as lead or copper ones are extremely dangerous from the poisonous salts liable to be formed, viz.: the acetate of lead or copper. It is a clear liquid, occasionally with a yellowish tint, and differs from dilute acetic acid in containing a small proportion of alcohol, acetic ether, and mucilage. Excess of alkali added to it, and the solution heated, gives a brown color to the liquor with a dark precipitate, which is supposed to be the decomposed mucilage. When of good quality, Distilled Vinegar is quite colorless, of a pure acetous odor, frequently somewhat ethereal, but entirely unmixed with empyreuma or other disagreeable taint, and is wholly evaporated by heat. It may be rendered unfit for pharmaceutical purposes, by the presence of metals or mineral acids. If sulphuric acid be present, a solution of chloride of barium will produce a white precipitate of sulphate of baryta; if nitric acid be present, a small piece of pure silver macerated for a few days in the Vinegar will be more or less dissolved; then if a drop or two of hydrochloric acid be added, a white precipitate of chloride of silver will be formed. If hydrochloric acid be present, a solution of nitrate of silver will occasion a white precipitate of the chloride of silver. Lead may be detected by sulphureted hydrogen forming a black precipitate of the sulphuret of lead; or, if sulphuric acid be added, a white sulphate of lead will be precipitated. Copper also forms a black precipitate of the sulphuret of copper with sulphureted hydrogen; or, if the liquid be saturated with ammonia, and sulphuric acid be added, a blue color will be produced. Ferrocyanide of potassium gives a reddish-brown color with copper, and a blue one with iron. Tin forms a brown precipitate with sulphureted hydrogen, the sulphuret of tin; or, a solution of chloride of gold will cause the deep purple precipitate, known as the purple of Cassius. (These same tests will answer to detect the impurities of concentrated acetic acid.) According to the U. S. Pharm., a fluidounce of Distilled Vinegar should be neutralized by thirty-five grains of crystallized bicarbonate of potassa, which is a much better test of its strength and purity than the specific gravity, which will be found to vary according to the proportion of alcohol, etc., which may be present. Wittstein states that two ounces of the Vinegar when good, will entirely neutralize one drachm of dry carbonate of potassa. A substitute for Distilled Vinegar, and one which, in many instances, is superior to it, is composed of one part of strong acetic acid to five or six parts of distilled water, or a sufficient quantity to give the density of Distilled Vinegar, which is 1.005 to 1.006.

Properties and Uses.—The properties of Distilled Vinegar correspond with those of ordinary Vinegar (see page 24).

Off. Prep.—Acetum Lobeliæ; Acetum Sanguinariæ; Acetum Scillæ; Tinctura Sanguinariæ Acetata Composita.

ACETUM LOBELIÆ. *Vinegar of Lobelia.*

Preparation.—Take, of Lobelia Seed, in powder, *four ounces;* Distilled Vinegar *two pints.* Macerate the Lobelia Seed with the Distilled Vinegar, in a close glass vessel, for seven days; then express the liquor, filter, and add to the filtered product, Alcohol *one fluidounce.*

History.—In this preparation Diluted Acetic Acid may be used as a substitute for the Distilled Vinegar. The Alcohol is added to impede the decomposition, and as its quantity is very small, no objection can reasonably be made to its presence. We have known this preparation to retain its activity for two years, when kept well corked and not exposed to the action of light.

Properties and Uses.—Vinegar of Lobelia is an emetic, nauseant, and expectorant, and is a valuable relaxant in spasmodic affections. It may be given to fulfill all the indications for which Lobelia is administered. Externally, it forms an excellent application in several cutaneous diseases, as salt-rheum, erysipelas, poisoning by rhus, etc. Dose, as an emetic, from one to four fluidrachms, repeated every fifteen minutes; as an expectorant, from five to thirty drops or more, every half-hour or hour, in elm or flaxseed infusion.

ACETUM SANGUINARIÆ. *Vinegar of Bloodroot.*

Preparation.—Take, of Bloodroot, in powder, *four ounces;* Distilled Vinegar *two pints.* Macerate the Bloodroot with the Distilled Vinegar, in a close glass vessel, for seven days; then express the liquor, filter, and add to the filtered product, Alcohol *one fluidounce.*

History.—In this preparation, Diluted Acetic Acid may be used as a substitute for the Distilled Vinegar. When kept well corked and in the dark, it may be preserved for a long time.

Properties and Uses.—Vinegar of Bloodroot is seldom used as an emetic, except in combination with other agents of this class. Its chief employment internally is as an expectorant, hepatic, and alterative. As an external application it is useful in many cutaneous affections. Dose, from ten to thirty drops, in some mucilage or syrup, and repeated three or four times a day.

ACETUM SCILLÆ. *Vinegar of Squill.*

Preparation.—Take, of fresh, dried Squill, in small fragments, *two ounces;* Dilute Acetic Acid, or Distilled Vinegar *one pint;* Proof-spirit *one and a half fluidounces.* Macerate the Squill in the Vinegar (or Dilute Acid) for seven days, in a covered vessel; strain and express the liquor, add the spirit, and filter the whole.—*Ed.*

Or, the Squill may be coarsely bruised and macerated for two or three days in half the above-named quantity of Dilute Acetic Acid, then placed in a displacement apparatus, and enough Dilute Acetic Acid be added, from time to time, as required, until one pint of Vinegar of Squill has filtered through.

History.—In this preparation either Dilute Acetic Acid or Distilled Vinegar may be employed. The addition of Proof-spirit prevents the too-rapid decomposition of the preparation, but as this is frequently required in cases where the least stimulus would be objectionable, it is better to make up no more at a time than the above formula calls for, leaving out the Spirit. Vogel says (*An. de Chim.*, *v.* 83, *p.* 157) that when kept, Vinegar of Squill deposits a precipitate consisting of citrate of lime and tannin.—*Coxe.*

Properties and Uses.—Vinegar of Squill contains all the medicinal virtues of the Squill. It is sometimes employed as an expectorant in affections of the air-vessels, and as a diuretic in dropsies; but, on account of its tendency to decomposition, its principal use is in the preparation of Syrup of Squill. Its dose is from half a fluidrachm to one or two fluidrachms in some aromatic water.

Off. Prep.—Syrupus Scillæ.

ÆTHEREA.

Ethers.

The action of several of the acids on alcohol produces an order of compounds, which possess both important chemical properties and medicinal virtues. They are named Ethers, and agree in certain general qualities, but differ in others, according to the acid used in their formation—they are all extremely volatile, and require to be kept in closely-stopped vials, and in cool situations.—*Coxe.* They are usually very odorous, have a somewhat sweetish flavor, and are exceedingly inflammable, requiring to be kept from the neighborhood of flame, especially when exposed to the air. Chemists are not precisely agreed upon the theory of etherification; though the ethyle hypothesis advocated by Liebig is the one more commonly entertained. Ethyle, $C_4 H_5 = Ae$, is hitherto unknown in a separate form; but is very well known as anhydrous oxide, or Ether, and hydrated oxide, or alcohol. These compounds have not yet been found as natural products of vegetable life, although it is probable that the fragrance of certain fruits, as pine-apples, melons, apples, etc., is derived from compounds of ethyle. The alcohol formed during vinous fermentation from grape sugar is considered a hydrate of the oxide of ethyle, which being acted upon by certain acids, removes from it its Ether or oxide of ethyle, which is a volatile substance ($C_4 H_5 O = Ae O$), and by combining with the acid forms a salt composed of the acid and the oxide.

ÆTHER ACETICUS. *Acetic Ether. Acetate of Oxide of Ethyle.*

Preparation.—"*Three parts* of finely powdered Acetate of Lead are to be put into a glass retort, with a previously cooled mixture of Concentrated Sulphuric Acid *one part*, and Alcohol, 90 per cent., *one part.* When the salt is thoroughly saturated and well shaken up with the spirit, place the retort in a sand-bath, having a receiver connected with it, but not quite air-tight, by means of a bladder; allow the mixture to digest for a whole day with a very gentle heat, and then distill to dryness. The acid distillate is shaken with some hydrate of lime, and, if it smells of sulphurous acid, with peroxide of manganese also; when neutralized, it is to be distilled until one-seventh remains in the retort. The product will equal, or rather exceed, in weight, the alcohol employed.

Several other processes have been pursued; thus the common acetate of soda may be employed. To Concentrated Sulphuric Acid *one part*, and Alcohol, 90 per cent., *one part*, add Acetate of Soda *one part*, and Water *half a part*. The Acetate of Soda and Water are to be first put in the retort, and then the mixture of Sulphuric Acid and Alcohol; then proceed as in the former process.

To prepare *Anhydrous Acetic Ether*, the lead salt must first be deprived of its water of crystallization by a gentle heat, and added to the spirituous acid mixture. The acid distillate is then shaken with one-third of its volume of water, and rectified over fused chloride of calcium.

History.—By mixing the alcohol and sulphuric acid, the latter separates from the former its water of hydration, which is replaced by two equivalents of hydrated sulphuric acid; these with the Oxide of Ethyle, form an acid salt, sulphovinic acid, or bisulphate of Oxide of Ethyle. When this comes in contact with acetate of lead, especially when heated, an exchange of elements takes place, neutral sulphate of lead, neutral Acetate of the Oxide of Ethyle, and free sulphuric acid resulting; the neutral Acetate of Oxide of Ethyle is removed by distillation, leaving the sulphate of lead and sulphuric acid as a residue. The distillate is not a pure Acetate of Oxide of Ethyle, but contains (dependent on the quantity of the acetate of lead and alcohol) water, alcohol, free acetic acid (formed by the action of a small portion of sulphuric acid on the sugar of lead—this can not be obviated, but is reduced by the digestion and distillation to a mere trace), almost always sulphurous acid, and free sulphuric acid, which latter, on the temperature increasing toward the end of the process, passes over. The distillate being agitated with the lime and peroxide of manganese, the free acetic acid, sulphurous acid (partly converted by the oxygen of the manganese into sulphuric and hyposulphuric acids), and the sulphuric acid combine with them, and are retained in the residue on rectification, while the neutral Acetate of Oxide of Ethyle, with the alcohol and some water, passes over, and constitutes the officinal Acetic Ether. The spirit is abstracted by shaking this with water, and the water by pouring off the ether which swims on its surface, and distilling it with fused chloride of calcium. By using the acetate of soda, exactly the same results are obtained, except that instead of sulphate of lead, the bisulphate of soda remains, which, when neutralized with lime, may be employed as Glauber's salts."—*Witt.*

Acetic Ether is a transparent liquid of a peculiar, but agreeable and powerful smell and taste. Its specific gravity is from 0.85 to 0.89; it boils at 160°. Seven or eight parts of water dissolve it; it mixes with alcohol and ether in every proportion, and is decomposed by acids and alkalies. It burns with a yellowish-white flame, and acetic acid is developed during its combustion. It is always present in small quantity in wine vinegar, which owes its flavor to this compound. Good Acetic Ether will not affect litmus and turmeric papers; volatilizes readily and rapidly at a gentle temperature; and, if it leaves a residue which is blackened by sulphureted hydrogen, lead is present, one part of Acetic Ether, and three parts of alcohol 80 per cent., form the Spiritus Aceticus Æthereus. The formula of Acetic Ether is $C_8 H_8 O_4 = Ae + \bar{A}$—it contains one equivalent each, of ethyle 29, oxygen 8, and acetic acid 51=88.

Properties and Uses—It is somewhat similar in its operation to sulphuric ether, but is milder, more agreeable, and more diaphoretic. It is used in nervous fevers, putrid fevers, cardialgia, spasmodic vomiting, and asthenic affections of the stomach and bowels. Dose from half a fluidrachm to two fluidrachms, in a sufficient quantity of water.

ÆTHER HYDRIODICUS. *Hydriodic Ether. Iodide of Ethyle.*

Preparation.—Mix *four parts* of Iodine with *ten parts* of Alcohol 38°. Add little by little *one part* of Phosphorus, and submit the whole to distillation. When the larger part of the alcohol has distilled over, add *three parts* more, and distill to dryness. The product of the distillation is mixed with water to separate the alcohol from the ether, which last is then rectified from chloride of calcium.

History.—Hydriodic Ether has no acid reaction. Its odor is ethereal, its taste pungent, but less sharp than that of sulphuric ether. Its density is 1.9206 at 72° F.; it boils at 160° F., and is not inflammable. When thrown on burning coals, it expands in purple vapors. It is not decomposed immediately by potassa, nor by nitric or sulphurous acids, but sulphuric acid decomposes it, and sets free a part of the iodine. The action of the air discolors it slightly by liberating a little iodine, which may be readily removed by the alkalies, or mercury, a globule of which thrown into the vial, is sufficient to retain the ether in a state proper for inhalation. Its density admits of its being kept under water, in which it is insoluble; but soluble in alcohol. Its formula is $C_4 H_5 I$.

Properties and Uses.—Hydriodic Ether, is recommended by Dr. Huette, by way of inhalation, as a remedial agent in several diseases, especially in pulmonary consumption, tubercular affections in any part of the body, and where it is desired to saturate the system quickly with iodine; it appears likely to play an important part in medicine. Fifteen to thirty grains of the Hydriodic Ether are transferred, by means of a graduated pipette, into a little ground-stoppered bottle (3 or 4 centimetres) an inch to an inch and a half high. The ether is covered with a stratum of water about two or two and a half millimetres thick, the object of which is to moderate the evaporation; when the vial is applied to one of the nostrils, and the air contained within it is drawn by an inspiration. The ethereal vapor is sufficiently diluted with air before reaching the lungs. The evaporation of the ether may be accelerated by inclining the vial to one side, so that the continuity of the watery layer may be broken; and the heat of the hand may be applied to the same object. Fifteen or twenty inspirations suffice for the impregnation of the system with iodine, and a quarter of an hour after the cessation of the inhalations, iodine is found in the urine, and has also been found present in fifty or sixty hours afterward.

The physiological effects of this ether, are said to be, "After some inhalations, an impression of calmness and satisfaction announces that the Hydriodic Ether acts at first conformably with the sedative properties of the other ethers employed in medicine. The respiratory motions are carried on with a readiness and fullness, advantageous to the circulation; but the antispasmodic action of the ethereal vapor which favors the absorption of the remedy, is soon followed by the influence of the absorbed iodine. The increase of vigor ceasing to be limited to the thoracic muscles, extends to the muscular system. The appetite is developed, the secretions are increased, the genital feelings become more sensitive, the pulse acquires fullness, and the vivacity of the feelings and the activity of the intellect, prove that the impulse given to the other organs extends to the brain also. Such are the effects that four daily inhalations of ten minutes each produced on Dr. Huette. As to accident, he never experienced any thing but a little coryza, and frequently when the vapor has been too concentrated, a slight feeling of pressure in the temples."

He thinks, that in many cases there will be an advantage in substituting the inhalation of Hydriodic Ether, for the other preparations of iodine, observing that inhalation permits the fractioning of the doses to any extent, and causes the absorption of the medicine by more extended surfaces, more generally accessible in all their parts, and better calculated for the absorption of the smallest medicinal atoms, than are the digestive organs.—*Am. Jour. Pharm. XXIII.*, 156.

SPIRITUS ÆTHERIS NITRICI. *Sweet Spirit of Nitre. Spirit of Nitric Ether. Solution of the impure Hyponitrite of Oxide of Ethyle in Alcohol.*

Preparation.—"Take of Rectified Spirit (alcohol) *two pints and six fluidounces;* pure Nitric Acid (D. 1500) *seven fluidounces.* Put *fifteen ounces* of the Spirit, with a little clean sand, into a two-pint matrass, fitted with a cork, through which are passed a safety-tube terminating an inch above the spirit, and another tube leading to a refrigeratory. The safety-tube being filled with pure Nitric Acid, add through it gradually *three fluidounces and a half* of the Acid. When the ebullition which slowly arises, is nearly over, add the rest of the Acid gradually, half a fluidounce at a time, waiting till the ebullition caused by each portion is nearly over before adding more, and cooling the refrigeratory with a stream of water, iced in summer. The ether thus distilled over being received into a bottle, it is to be agitated, first with a little milk of lime till it ceases to redden litmus-paper, and then with half its volume of a concentrated solution of muriate of lime. The pure hyponitrous ether thus obtained, which should have a density of 0.899, is then to be mixed with the remainder of the Rectified Spirit, or exactly four times its volume.

"Spirit of Nitric Ether ought not to be kept long, as it always undergoes decomposition, and becomes at length strongly acid. Its density by this process is 0.847."—*Ed.* The above measures are Imperial.

Wittstein gives the following formula: "Alcohol, 80 per cent., sp. gr. 0.840, *twenty-four parts*, is combined with pure Nitric Acid, sp. gr. 1.20, *six parts*. This is distilled in a sand-bath, or over a naked fire, until *twenty parts* have passed over; lime is then added and shaken with it so long as it reddens litmus-paper; the neutral fluid poured from the excess of lime is now rectified to a small residue, and to exclude the external air the space between the retort and receiver must be tightly connected by a bladder, in which there are only a few needle punctures to allow the air contained in the receiver to escape. About eighteen parts of Sweet Spirit of Nitre are obtained, which must be at once put into three or four ounce vials, well filled and stopped; thereby preventing the whole stock from becoming acid at once from frequent exposure to the air."

History.—In the process of the Edinburgh Dispensatory, pure hyponitrous ether is first formed, to which, subsequently, four volumes of rectified spirit are added. When the operation is conducted on a large scale, violent action and dangerous explosions will be apt to occur, unless the precautions named in the first part of the Edinburgh formula are strictly attended to. When the ebullition manifests a tendency to become tumultuous, according to Christison, it may be subdued at once by simply blowing cool air across the matrass. The presence of the sand in the matrass, and the position of the extremity of the safety-tube, are essential precautions, without which the liberation of the ether is attended with dangerous succussions or violent ebullition. Under ordinary circumstances nitric acid will not combine with the oxide of ethyle contained in alcohol, but by losing two equivalents of oxygen, it is converted into hyponitrous acid, and then enters into combination with it. The two equivalents of oxygen are, however, not evolved free, but acting on another portion of alcohol abstracts from it two equivalents of hydrogen, forming two equivalents of water, and a new body, aldehyd, or dehydrogenized alcohol, $C_4\ H_4\ O_2$. Other secondary products are also formed. The distillate is slightly acid, from which it is freed by agitation with milk of lime; and any water or alcohol it may contain is removed by the addition of concentrated solution of chloride of calcium; a pure ether separating and floating on the saline solution. Wittstein states that a portion of aldehyd remains stubbornly combined with the hyponitrous ether; to remove which, it must be rectified to about one-sixth in an apparatus through which, during the distillation, a continuous stream of carbonic acid is passed, otherwise the oxygen of the air in the apparatus would mix with the aldehyd and ether, and cause the formation of free nitric acid.

In the formula given by Wittstein, nitrite of oxide of ethyle and aldehyd are formed chiefly, which remain dissolved in the excess of alcohol. For a very excellent article on the method of preparing Sweet Spirit of

Nitre, by E. R. Squibbs, M. D., of the U. S. Navy, see *Am. Jour. Pharm. XXVIII.*, 289. Sweet Spirit of Nitre is of a very light greenish-yellowish color, of a strong agreeable ethereal taste and odor, somewhat analogous to those of ripe apples, and of a specific gravity varying from 0.834 to 0.850, and even 0.899. It is very volatile, producing much cold by its evaporation, and is also inflammable, its flame being whitish. On keeping it becomes strongly acid, more especially when frequently exposed to atmospheric action. It readily combines with water or alcohol, boils at 157°, and should not redden litmus-paper. By evaporation with gentle heat it gives no residue. When its decomposition into acid, etc., has not proceeded far enough to give an effervescence with carbonate of potassa, it is not worth noticing. By keeping crystals of bicarbonate of potassa in Sweet Spirit of Nitre, Mr. Harvey says, its tendency to acidify will be prevented without its becoming appreciably alkaline. If chloric ether be present in Sweet Spirit of Nitre, nitrate of silver will cause a white precipitate of chloride of silver. If aldehyd be present a solution of caustic potassa will produce an irritating, cinnamon odor, and impart a yellow color to the liquid, owing to the formation of an oil which rapidly oxidizes and is converted into a resin, but which is different from the brown resin of aldehyd, also formed by the addition of potassa. Acids, as acetic and nitric, may be known by litmus-paper, and carbonate of potassa as above stated. Acetic acid, is very apt to form rapidly when aldehyd is present, owing to the action of oxygen, which converts it into acetic acid and water. The greater part of the Sweet Spirit of Nitre of the shops is adulterated either with alcohol or water, which, of course, materially impair its value as a medicine; these adulterations are exceedingly difficult to detect. The presence of alcohol might be detected by adding an article to the suspected fluid which is soluble in that menstruum but not in ether or water; while water might be ascertained by the solution of a substance soluble in this fluid, but not in ether or alcohol. Sweet Spirit of Nitre is composed of hyponitrous ether, alcohol, and a little aldehyd, which latter is difficult to remove entirely, unless the distillation during the process of obtaining the spirit be stopped immediately upon the first appearance of this impurity. When the aldehyd is removed, the spirit consists of one volume of hyponitrous ether, and four volumes of alcohol.

Properties and Uses.—When not adulterated with water or alcohol, Spirit of Nitric Ether is a stimulant and antispasmodic, in its actions closely resembling those of sulphuric ether, but less energetic. As a diuretic, it is considered useful in dropsy associated with diseased heart, more so than when connected with diseased kidney; being a stimulant diuretic, it is best adapted to asthenic conditions. In dropsy it may be advantageously combined with syrup of squill, acetate, bicarbonate, or nitrate of potassa, or tincture of digitalis. It is useful in strangury, and is a good addition to copaiba as a diuretic for diluting the acrimony of the urine. However, it will be found an uncertain diuretic, not always exerting this influence in cases where it is administered. It is often used in fevers as a refrigerant and mild diaphoretic, and may be given alone, or in conjunction with other agents to cause diuresis and perspiration. When the preparation becomes old, nitrous acid is formed, and its internal administration will be followed by pain in the stomach and gripings. As a carminative, it is frequently useful in relieving flatulence and allaying nausea. On account of its volatility, it may be applied externally to produce cold by its evaporation. Spirit of Nitric Ether when inhaled is a narcotic poison; its accidental inhalation during sleep has caused death. Pereira gives the following mode of treatment for persons who have inhaled this ether, as well as *carbonic acid gas:* "Remove the patient immediately into the open air, and place him on his back, with his head somewhat elevated. Produce artificial respiration by pressing down the ribs, forcing up the diaphragm, and then suddenly removing the pressure. Dash cold water over the body, apply bottles of hot water to the feet," with frictions, inhalations of ammonia, and stimulants. Dose of Spirit of Nitric Ether, from half a fluidrachm to two fluidrachms, three or four times a day in water, or according to the indications to be fulfilled.

Off. Prep.—Mistura Copaibæ Composita.

ÆTHER SULPHURICUS. *Sulphuric Ether. Oxide of Ethyle.*

Preparation.—"Take of Sulphuric Acid *ten fluidounces*, Alcohol *fifty fluidounces*. Pour *twelve fluidounces* of the spirit gently over the Acid in an open vessel, and then stir them briskly and thoroughly; transfer the mixture immediately into a glass matrass connected with a refrigeratory, and raise the heat quickly to about 280° F. As soon as the ethereal fluid begins to pass over, supply fresh alcohol through a tube into the matrass in a continuous stream, and in such quantity as to equal the volume of the fluid which distills over. This is best done by connecting one end of the tube with a graduated vessel containing the Alcohol—passing the other end through a cork fitted into the matrass—and having a stopcock on the tube to regulate the discharge. When the whole Alcohol has been added, and *forty-two fluidounces* have distilled over, the process may be stopped. Agitate the impure ether with *sixteen fluidounces* of a saturated solution of Muriate of Lime, containing also *half an ounce* of Lime recently slaked. When all odor of sulphurous acid has disappeared, pour off the supernatant liquid, and distill it with a gentle heat so long as what passes over has a density not higher than 0.735. More ether of equal strength may be obtained from the muriate of lime, and from the residuum of each distillation a weaker ether may be obtained in small quantity, which must be rectified by distilling it gently again."—*Ed.* The above measures are Imperial.

History.—As previously stated, alcohol is a hydrated oxide of ethyle, while ether is the Oxide of Ethyle deprived of its water. When alcohol comes in contact with sulphuric acid, the latter separates it from its water of hydration, which is replaced by two equivalents of hydrated sulphuric acid; these, with the Oxide of Ethyle, form an acid salt, sulphovinic acid, or rather a bisulphate of oxide of ethyle. From some unexplained reason a small portion of alcohol, and consequently of sulphuric acid, always remains unacted on. When the mixture is heated to 284° F., it begins to boil; the bisulphate of oxide of ethyle is, however, not permanent at this temperature, but, decomposing, forms hydrated sulphuric acid and ether; and the sulphuric acid not being volatile at 284 ° F., remains behind as a hydrate, the ether and some water passing over, but uncombined.

The formation of the ether then is due to the formation of bisulphate of oxide of ethyle from sulphuric acid and alcohol, and the instability of this body at its boiling point. The hydrated sulphuric acid thus liberated, and remaining in the retort, has the property, as before stated, of again combining with alcohol, with the same results; hence the reason for the addition of alcohol in a very small stream, or by drops, to the boiling mixture. Against the possibility of this new formation of bisulphate of oxide of ethyle may be objected, the temperature of the boiling mixture, which would rather favor a decomposition. To meet this, it may be suggested that the drops of cold alcohol cause a momentary cooling in a small circle, thus allowing the possibility for combination; the next moment, however, the temperature rises, and decomposition again ensues. The chemical process, during the dropping of the alcohol into the boiling mixture, is thus a continuous formation of bisulphate of oxide of ethyle, and its instantaneous decomposition into sulphuric acid, ether, and water.

There are some minor conditions by which the quantity and purity of the product is modified. By the contact of hydrated sulphuric acid and absolute alcohol, the action of the acid on alcohol must, according to the preceding statement, be endless, and if only ether and water distilled over this would be the case; but, for reasons which we can not at present control, the process is not entirely so simple; for instance, the sulphuric acid acts as an oxidizing agent on the elements of the alcohol, causing the formation of sulphurous acid, that passes over, and a carbonaceous body remaining behind, which at first is quite soluble, coloring the acid of a deep brown, but gradually increasing (together with sulphurous acid), it separates as a tough black pellicle on the surface. On the composition of this black body there are yet doubts; its elements are carbon, hydrogen, oxygen and sulphur ($C_{80} H_{24} O_{20} S_3$?). Another product of decomposition during the process, is oil of wine$=C_4 H_4$, a yellowish thick oil which on rectifying the ether is commonly found floating on the watery residue. This destructive action occurs with absolute as well as hydrated alcohol, and on account of the high price of the former, alcohol of about 90 per cent. is used. The employment of this alcohol also circumscribes the action of the sulphuric acid, on account of its containing at the outset ten per cent. of free water. It is clear that in employing this alcohol the acid continually acquires more water, abstracting it from the alcohol, and retaining it with a force which prevents more than a small portion passing over with the ether. There comes, however, a time when the acid has taken up as much water as under the circumstances it can retain (the boiling point of this mixture is only 254° F.) Together with the ether, water is now liberated; when, however, they meet in their nascent state, they again combine, forming alcohol. It is consequently a rule, and a highly important one to remember, that the yield of ether is continually smaller, in proportion to the water combined with the alcohol; that of 80 per cent., containing 20 per cent. of water, gives on distillation a far greater amount of spirit than ether, consequently it must not be employed.— *Witt.*

However carefully the process may have been conducted, the ether is usually impregnated with some of the above named substances. To remove the alcohol and water which are present in the ether, the solution of muriate of lime is added, while the slaked lime removes any sulphurous acid which may be present, and the whole is re-distilled at a gentle heat not sufficient to vaporize the alcohol and water.

Ether is a transparent, thin, mobile, very volatile fluid, of an agreeable, penetrating, peculiar odor, a pungent, cooling, spirituous taste, and a high refractive power. It is highly inflammable, and the greatest care must be taken in keeping its vapor from the neighborhood of flame of any kind. It is a bad conductor of electricity, may be frozen at 46° below zero, boils at about 98° F., when of sp. gr. 0.720, and at 40° F., below zero, when in a vacuum. Its sp. gr. at 60°, when pure, is 0.720, though that of the shops will be found to vary from 0.733 to 0.765; for officinal purposes it may range from 0.740 to 0.750, but not beyond this in either direction of the scale. The vapor of ether, according to Gay-Lussac, has the sp. gr. 2.586. Absolute ether of 0.720 is soluble in 10 parts of water; officinal ether 0.950 in nine parts; both are miscible with alcohol in any proportion. Pure ether, when freshly made, causes no alteration in the color of litmus or turmeric paper; but, by exposure, it absorbs oxygen, oxidizes slowly, and decomposes, yielding aldehyd, aldehydic acid, acetic and formic acids. Its vapor is very apt to form dangerous explosive mixtures with oxygen, or atmospheric air. It is rapidly volatilized in an open dish, at the ordinary temperature, without leaving a residue; if an oily liquid remains, smelling of fusel oil, and possessing a sharp taste, this arises partly from the employment of a very impure alcohol, and partly from the presence of a little oil of wine. By evaporation ether produces intense cold. Pure ether dissolves one-eightieth of its weight of phosphorus; but if it contains alcohol, only one two hundred and fortieth; it also dissolves a very small portion of sulphur, bromine, and iodine, but the solutions of the latter decompose by keeping. It abstracts bichloride of mercury, terchloride of gold, bichloride of platinum, and the sesquichloride of iron, from their watery solutions. It dissolves most resins, pyroxylic spirit, many fats, volatile oils, gallic acid, some of the vegetable alkaloids, urea, osmazome, gun-cotton, chromic acid, tannic acid, caoutchouc, etc. Its formula is $C_4 H_5 O$, and its equivalent weight 37.

Dr. C. F. Schonbein states that if a little pure ether be put into a bottle filled with pure oxygen or atmospheric air, and exposed to diffused light, the bottle being occasionally shaken, the ether, after the lapse of four months, will have acquired new properties. Although producing no action upon blue litmus-paper, it will discharge the color of solution of indigo, convert pure phosphorus, when immersed in it, into phosphorus acid, eliminate iodine from iodide of potassium, change pure sulphate of protoxide of iron to the basic and acid sulphate of the deutoxide, transform yellow prussiate of potassa into the red salt, convert sulphuret of lead into the sulphate, etc. Similar effects are produced with oil of turpentine and oil of lemons, when treated in the same way as the ether. He expresses an opinion that the property which these substances thus acquire, is due to the presence of oxygen in a chemically exalted condition.

M. Grimault has given a method by which pure ether may be gelatinized, or if required, various substances may be dissolved in it, as camphor, cyanide of potassium, morphia, conia, etc. If four measures of pure ether are added to one measure of white of egg, and the mixture be briskly agitated, the albumen will soon be seen to swell, and absorb the entire ether, forming a thick collodion, which soon becomes an opaline, trembling jelly, and does not separate into the two ingredients of which it is composed. Applied to the skin, and covered with a band of cloth, or caoutchouc, it speedily causes redness without vesication; and when it begins to dry, a new layer may be applied if necessary. If the mixture be exposed to a water-bath at 158° F., an almost instantaneous solidification is obtained without the separation of ether.

Ether may be recognized by its combustibility, its yellowish-white flame, its volatility, its peculiar odor and taste, its complete solubility in alcohol, and its sparing solubility in water, separating from it, so that two layers of fluid are formed. Ether may be adulterated with acids, alcohol, water, oil of wine, etc. Litmus will detect the presence of acid, which may be neutralized by adding potassa to the fluid, until it gives no acid reaction, shaking it well. Non-volatile matters may be detected by remaining after the ether has been removed by distillation or evaporation. If a mixture of ether and water produce a white color, oil of wine is present; the ether may be separated by distillation at a gentle heat. Alcohol in too large a quantity will increase the specific gravity of the ether; it may be removed by shaking the ether with double its volume of water. Upon standing, the water and alcohol separate from the ether, which forms the upper layer, and may be removed by decantation. The water which the ether acquires by this process may be removed by distillation over chloride of calcium.

Properties and Uses.—Ether is a narcotic, stimulant, antispasmodic, refrigerant, and carminative. In moderate doses it powerfully acts upon the mouth, throat, and stomach, allays spasm, relieves flatulence, without increasing arterial action. It first excites the cerebral functions, then depresses. In somewhat larger doses it causes intoxication. In very large doses it causes nausea, increased flow of saliva, giddiness and suspension of sensation and voluntary motion. Locally applied, it produces rubefaction, and sometimes vesication, if its evaporation be prevented; but acts as a refrigerant, occasioning a great degree of cold, when suffered to evaporate. Its antispasmodic and stimulating properties render it efficacious in spasmodic asthma, flatulent colic, hiccough, subsultus tendinum, cramp of the stomach, nervous headache, lowness of spirits, gastrodynia, hysteria, dyspnœa, palpitation, and gout of the stomach; it is also efficacious to overcome the painful spasms occasioned by urinary or biliary calculi, during their passage through the ducts or tubes; for this purpose it is frequently conjoined with oil of turpentine. As an antispasmodic, it will be found useful in all forms of spasmodic action, unattended by inflammation, as chorea, epilepsy, tetanus, etc. The dose of ether varies from ten to sixty drops, which should be repeated at short intervals. It may be given in water by triturating it with a little spermaceti; and is frequently combined with opium, ammonia, or valerian.

When applied locally as a refrigerant, allowing it to evaporate, it is useful in nervous and other headaches, in external inflammations, strangulated hernia, etc. As a rubefacient, it may be employed in all cases where this effect is indicated, by checking its evaporation.

The virtues of many agents containing vegetable oils and resins, may be taken up by ether in the form of tincture, when, by evaporating the ether, the desired active product is left behind; this is the case with lobelia seeds, capsicum, scutellaria, podophyllum, ptelea, stillingia, xanthoxylon berries, iris, and several other officinal preparations. Under the name of *Letheon*, ether is sometimes employed as an anæsthetic agent, for the prevention and removal of pain and spasm, and whenever severe operations are about being performed. It has also been employed in this manner, in severe dysmenorrhea, as well as during parturition. It may be used in a similar manner to that for inhaling chloroform; about from four to six minutes will be required before anæsthesia occurs, the patient generally inhaling the vapor from a fluidounce and a half to two fluidounces of the liquid; it should be used in small quantities at a time, and any depression of the pulse, or spasmodic symptoms occurring during its inhalation indicate danger, and its further inhalation should be discontinued. Stimulants, cold water to the head and spine, electro-magnetism, etc., are the means to overcome its unpleasant effects. To produce anæsthesia chloroform is more commonly preferred. The practice of frequently inhaling ether is dangerous, often causing inflammation of the brain, or insanity.

Off. Prep.—Lotio Ætheris Composita.

AMMONIA.

AMMONIÆ CARBONAS. *Carbonate of Ammonia. Sesquicarbonate of Ammonia. Mild Volatile Alkali.*

Preparation.—Take of finely powdered Hydrochlorate of Ammonia, *one pound;* Carbonate of Lime (Chalk) finely powdered and dried, *a pound and a half.* Mix them together thoroughly, and subject the mixture in a retort with a proper receiver, to a gradually increasing heat so long as any vapors sublime.—*Ed.*

"The above mixture is exposed in a sand-bath for an hour or two, according to the quantity, to a gentle heat until all the moisture is driven off, and is then quickly transferred to a cast-iron retort having a short, wide neck dipping into a large glass receiver, without being luted, and the retort heated so long as ammoniacal fumes are evolved. In order to prevent the receiver from becoming too hot, it is best to pass the neck of the retort through a hole in the side of the furnace made on purpose, and also to cool it with a stream of cold water. In emptying the receiver it is often necessary to break it; and this is best done by just cracking the neck with a stone, then applying a red hot iron to the place, and immediately afterward a drop or two of cold water. The salt is to be quickly put into well closed vessels. In the absence of an iron retort, a glass one may be used, but it should be coated with clay to prevent its cracking or melting during the operation. Such a luting may be prepared by dissolving borax in eight parts of warm water, and adding so much slaked lime that a thick pap is formed, which is painted over the retort three or four times consecutively with a brush. When dry a thin paste of linseed oil and slaked lime is applied the same number of times. If the luting cracks in the fire, more of the last paste is applied to the spot and sprinkled with finely powdered slaked lime. The yield will be about two-thirds the weight of the sal ammoniac employed.

History.—If a mixture of muriate of ammonia ($N H_4 Cl$) and carbonate of lime ($Ca O + C O_2$) is exposed to a high temperature decomposition ensues; the lime yields its oxygen to the ammonium, the calcium combines with the chlorine, and remains behind as chloride of calcium, while the carbonic acid passes to the oxide of ammonium; but only two-thirds of the latter unite with it, so that a combination of two equivalents oxide of ammonium and three equivalents of carbonic acid pass over, together with oxide of ammonium. 668 parts of muriate of ammonia do not require more than 625 parts of carbonate of lime, but as the chalk is not pure carbonate of lime, and an excess is by no means prejudicial, half as much again is employed. A thorough decomposition ensues only at a low red heat, consequently the employment of an open fire is unavoidable. If the mixture were not previously well dried, a moist mass is obtained on distillation instead of a fine dry salt. The residue may be employed for chloride of calcium."—*Witt.* Sesquicarbonate of Ammonia is also made from sulphate of ammonia, coal-gas liquor, etc. Sesquicarbonate of Ammonia is a firm, white, crystalline crust, smelling strongly of ammonia, and having a strong, alkaline and ammoniacal taste. Its reaction is strongly alkaline; it is volatile at a gentle heat, soluble in two parts of cold water, but not in alcohol, and is decomposed in boiling water, giving off carbonic acid. If not carefully excluded from the air, its composition becomes altered, it suffers a considerable loss of weight, and lastly falls into a powder. This change does not consist in absorption of carbonic acid from the air, but a separation of the salt into bicarbonate and simple Carbonate of Ammonia; the last evaporates quickly, while the former is more slowly volatilized. Bicarbonate of ammonia dissolves in eight parts of cold water; consequently, should the Carbonate of Ammonia require more than two parts of water for its solution, it contains *bicarbonate.* If a white insoluble residue is left on treating with water, which dissolves with effervescence in nitric acid, and blackens with sulphureted hydrogen, *lead* is present (carbonate of lead). If the solution, saturated with nitric acid gives a white precipitate with nitrate of silver, becoming violet on exposure to the light, *chlorine* is present, from volatilized, undecomposed sal ammoniac. If the solution is carefully neutralized with hydrochloric acid, and then is precipitated violet or blue with tannic acid, *iron* is present. When its solution, saturated with nitric acid, gives a white precipitate with chloride of barium, a *sulphate* is present (sulphate of ammonia). If the salt does not return the color of red litmus to blue, it has become converted into the bicarbonate. It is very apt to be contaminated with *empyreumatic oil* when prepared from gas-liquor, which colors the salt and renders its solution in dilute acids deeply colored or blackish; if the salt be pure its acid solution is colorless, and it leaves no residuum when heated on platinum or glass. As copper and brass communicate a blue color to Sesquicarbonate of Ammonia, it should be powdered in a glass, wedgewood, or iron mortar. The formula of this salt is $2NH_4O + 3CO_2$; its equivalent weight 118.

Sesquicarbonate of Ammonia is *incompatible* with acids, caustic potassa, or soda, magnesia, alkaline carbonates, lime-water, chloride of calcium, alum, bitartrate of potassa, bisulphate of potassa, bichloride of mercury, most salts of iron, and lead, sulphate of zinc, etc.

Properties and Uses.—In large doses Carbonate of Ammonia is a powerful narcotic and irritating poison; in small doses it is an energetic diffusible stimulant, and antispasmodic. The effects of an overdose are pains in the abdomen, convulsions, and nervous derangement. Its stimulating properties render it useful in low continued fevers, in which it acts without increasing the circulation or the cerebral functions. It is also useful as an antacid in gastric derangement from dissipation, epilepsy, and sick headache. Combined with guaiacum it has been serviceable in chronic rheumatism, and has likewise proved beneficial in epilepsy, hysteria, chorea, scrofula, and other chronic disorders, more especially when these are attended with acidity and debility of the digestive organs. Full doses have been given to occasion vomiting in paralysis. It is much used under the name of *Smelling Salts*, combined with some aromatic oil, as a stimulant in hysteria, fainting, headache, etc. *Mounsey's Preston Salts* are made as follows: Take Oil of Cloves *one fluidrachm*, Oil of Lavender, *two fluidrachms*, Essence of Bergamot *five fluidrachms*, Liquor Ammonia, sp. gr. 0.880, *one pint.* Mix and make an essence. Half fill the bottles with rough Carbonate of Ammonia, then fill up with finely powdered Carbonate of Ammonia, and add as much of the above essence as the Ammonia will absorb. Externally it is a gentle rubefacient, but is seldom employed in this way. The dose is from five to twenty grains every three or four hours, in the form of pill, or dissolved in some aqueous vehicle.

A plaster of Carbonate of Ammonia has been recommended by Phœbus as an excellent application to check emesis from sea-sickness; it is composed as follows: Melt Galbanum Plaster *two ounces*, add to it Opium, in powder, *one drachm*, Camphor, in powder, *two drachms;* stir together constantly, and when nearly cool add Oil of Cajeput *eighty drops*, Carbonate of Ammonia, in powder, *one drachm.* Spread on cloth, and apply over the pit of the stomach. In nervous headache, the following has been advised, in doses of about half a drachm, three or four times a day: Mix together *five ounces* of Carbonate of Ammonia, *two drachms* of Oil of Lavender, and *one ounce* of Alcohol. Place in a retort and distill as long as any fluid comes over. At the same time Aqua Ammonia may be gently inspired through the nostrils from time to time.

AMMONIÆ LIQUOR. *Liquor Ammoniæ. Aqua Ammoniæ. Solution of Ammonia. Water of Ammonia.*

Preparation.—"Take of Muriate of Ammonia *thirteen ounces;* Quicklime *thirteen ounces;* Water *seven fluidounces and a half;* Distilled Water *twelve fluidounces.* Slake the Lime with the Water, cover it up till it cools, triturate it well and quickly with the Muriate of Ammonia previously in fine powder, and put the mixture into a glass retort, to which is attached a receiver with a safety-tube. Connect with the receiver a bottle also provided with a safety-tube; and containing four ounces of the Distilled Water, but capable of holding twice as much. Connect this bottle with another loosely corked, and containing the remaining eight ounces of Distilled Water. The communicating tubes must descend to the bottom of the bottles at the further end from the retort; and the receiver and bottles must be kept cool by snow, ice, or a running stream of cold water. Apply to the retort a gradually increasing heat till gas ceases to be evolved; remove the retort, cork up the aperture in the receiver where it was connected with the retort, and apply to the receiver a gentle and gradually increasing heat, to drive over as much of the gas n the liquid contained in it, but as little of the water as possible. Should the liquid in the last bottle not have the density of 0.960, reduce it with some of the stronger Aqua Ammonia in the first bottle, or raise it with distilled water, so as to form Aqua Ammonia of the prescribed density."—*Ed.* The fluid measures in this formula are Imperial. We have by this process a *Liquor Ammoniæ Fortior*, sp. gr. 0.880, and *Liquor Ammoniæ* sp. gr. 0.960.

History.—Muriate of Ammonia consists of an equivalent of ammonium NH_4 and chlorine$=NH_4$ Cl. Lime (oxide of calcium$=$Ca O) decomposes it, forming chloride of calcium, water, and ammonia. 668 parts require only 350 parts of lime, but rather more is prescribed, as in the first place the lime may not be quite pure, and the excess will also insure a more certain contact with the muriate of ammonia; for this reason more water is ordered than is necessary to slake the lime, viz., sufficient to convert the whole into a thick paste. The slaking of the lime, which is thus converted in a convenient manner into an extremely fine powder, is due to the avidity with which this base combines with one equivalent of water, forming a hydrate. The heat thus generated is partly owing to the water passing from the fluid to the solid state, and also from the great affinity lime has for it. In order to obtain most of the gas entirely pure, two vessels must be employed, the receiver to hold any impurities that may pass over, and the quart bottle holding the distilled water which absorbs the pure gas as it passes over. Glass tubes are recommended to connect them, but on account of their fragility, leaden ones may be used without any prejudicial results. It is necessary to keep the bottle well cooled, otherwise a considerable loss of ammonia will ensue, as much heat is evolved during its passage from the gaseous to the liquid state. The tube which passes into the bottle should be long enough to reach nearly to its bottom, and should be connected with it, not quite air-tight, by means of bladder. Solution of Ammonia sp. gr. 0.96 contains in 100 parts 90.4 of water, and 9.6 of ammonia, consequently ten parts contain nearly one part of pure ammonia. Solution of Ammonia may also be prepared from sulphate of ammonia.—*Witt.*

Liquor Ammonia is a transparent liquid, of a peculiarly pungent odor, and a caustic, alkaline taste. It quickly browns turmeric paper, which regains its yellow color on exposure to the air. On account of its volatility it must be kept in bottles with well-fitted glass stoppers, and in a cool place; corks are changed to a brown color, and gradually corroded by it. If the Liquor Ammonia contains a trace of *Muriate of Ammonia*, it may be detected by saturating it with nitric acid, and then adding a drop of a solution of nitrate of silver, which will produce a white precipitate of chloride of silver. If *carbonic acid* be present, a white carbonate of baryta will be produced by agitating the liquor with baryta water; lime-water, or chloride of calcium will also produce a white precipitate of carbonate of lime. If *sulphuric acid* be present, chloride of barium will cause a white precipitate insoluble in hydrochloric acid. When tin vessels are used, the liquor may contain some *oxide of tin*, but this being insoluble in it, will be deposited after a few weeks' standing. If *copper* be present (as an oxide) the liquor will have a bluish tint, and by the addition of sulphureted hydrogen, or hydrosulphate of ammonia, a black precipitate of sulphuret of copper is formed, which may be removed by deposition and filtration. Sesquicarbonate of ammonia produces a precipitate when lime or other earthy matter is present. According to Dr. Maclagan, Liquor Ammonia, when prepared from gas liquor, is apt to contain some of its volatile ingredients; when an excess of nitric or sulphuric acid is added to the solution, and a red color is imparted passing into purple; or, when the solution is supersaturated with hydrochloric acid, and a clean shaving of fir-wood inserted into it became colored a rich purple—these are evidences of the gas-liquor impurities. The *incompatibilities* of Liquor Ammonia are about the same as those of the sesquicarbonate of ammonia.

The specific gravity of Liquor Ammonia will show the percentage of Ammonia contained in the solution. Davy, in "Elements of Chemical Philosophy," p. 268, has given the following table for this purpose:—

100 parts of sp. gr. at 59° F. contain of Ammonia:

Sp. Gr.	Ammonia.	Sp. Gr.	Ammonia.
0.8750	32.50	0.9435	14.53
0.8875	29.25	0.9476	13.46
0.9000	26.00	0.9513	12.40
0.9054	25.37	0.9545	11.56
0.9166	22.07	0.9573	10.82
0.9255	19.54	0.9597	10.17
0.9326	17.52	0.9619	9.60
0.9385	15.88	0.9692	9.50

Properties and Uses.—Liquor Ammonia is a powerful irritant and narcotic poison, producing in large doses tetanus and coma, and in smaller quantity inflammation or ulceration. In medicinal doses it is an energetic stimulant, especially of the nervous system, prompt, diffusible, and transient. It is adapted for speedily rousing the action of the vascular and respiratory systems, and for the prompt alleviation of spasm. It exerts but little action on the cerebral functions, while it stimulates the vascular system. It acts as a useful antacid in cases of acid stomach, and in diseases which are caused or augmented in severity by this gastric condition, as sick-headache, spasm, heart-burn, palpitation, etc. It has likewise been used as a stimulant and antispasmodic in neuralgia of the face and head, asthma, pertussis, and delirium-tremens; and is highly recommended as an internal stimulant in cases of retrocession of old and obstinate cutaneous eruptions. The vapor of Liquor Ammonia inhaled through the nostrils, makes a powerful impression on the nervous system, and is useful in syncope, to prevent an attack of epilepsy, hysteria, etc. I have used the Liquor Ammonia successfully in the treatment of hydrophobia, an account of which will be found in the "Western Medical Reformer," Vol. VI., Oct., 1846, p. 83. Externally Ammonia may be used as a rubefacient, irritant, or vesicant, as may be required, in rheumatic and neuralgic pains, and internal inflammations. It has been found to benefit burns when not too extensive. Its combination with oil forms a rubefacient liniment much used. Dose of Liquor Ammonia from five to twenty or thirty drops, sufficiently diluted. The antidotes to it when swallowed in large doses, or in an undiluted state, are acids, as vinegar, juice of oranges or lemons, cider, etc., which should be administered at once to secure any good effects; they combine with the ammonia forming harmless salts. Inflammatory symptoms must be met according to indications.

AMMONIA LIQUOR FORTIOR. *Liquor Ammoniæ Fortior*, or *Stronger Solution of Ammonia*, has properties very similar to those of the Liquor Ammonia, being, however, more highly caustic, acrid, and alkaline. Its sp. gr. should be 0.880 or 0.882, while that of the officinal solution should be 0.960. Both of these solutions should be kept in two or four ounce vials, and well stopped, as they rapidly lose their ammoniacal strength by contact with the atmosphere. In determining the strength of Liquor Ammonia, the hydrometer should always be used.

Properties and Uses.—Undiluted, this Solution of Ammonia is entirely too potent for medicinal use. Its principal employment is externally as a counter-irritant. The formula for *Gondret's Ammoniacal Ointment* as improved is as follows: Take of lard sixteen drachms, oil of sweet almonds one drachm; melt the lard and mix it with the oil in a wide mouthed vial with a glass stopper; then add Liquor Ammonia, sp. gr. 0.905, eight and a half drachms; close the bottle, mix the contents by agitation, and keep in a cool place. Rubbed on the skin it causes rubefaction, but if covered by a compress it speedily produces vesication. If well prepared, vesication will take place in from eight to twelve minutes.

The *officinal preparations* of Liquor Ammonia, sp. gr. 0.960, are Linimentum Ammôniæ; Linimentum Capsici Compositum; Linimentum Saponis Camphoratum.

LIQUOR AMMONIÆ ACETATIS. AMMONIÆ ACETATIS LIQUOR. *Solution of Acetate of Ammonia. Spirit of Mindererus.*

Preparation.—"Take of Sesquicarbonate of Ammonia *one ounce;* Distilled Vinegar (or Diluted Acetic Acid) *twenty-four fluidounces;* mix them and dissolve the salt. If the solution has any bitterness, add by degrees a little Distilled Vinegar till that taste be removed. The density of the Distilled Vinegar should be 1.005, and that of the Liquor Ammoniæ Acetatis 1.011."—*Ed.*

Distilled Vinegar or pure Acetic Acid diluted should be used in making this preparation, and not pyroligneous acid sufficiently reduced. Wittstein states that the best method in preparing this solution is to calculate the strength of the Liquor Ammoniæ Acetatis from the quantity of acetic acid employed, the strength of which is determined, not by its specific gravity, but from the quantity of dry carbonate of potassa or soda it has been previously found to neutralize. 865 parts of dry (anhydrous) carbonate of potassa, or 665 parts of dry carbonate of soda, correspond to 638 parts of anhydrous acetic acid. If the strength of the acetic acid is once thus established, it is quite immaterial what proportion of carbonate or liquor ammonia is required to neutralize it, as a sufficient quantity of water to bring it to the proper strength may then be added.

In the methods usually pursued, the ordinary sesquicarbonate of ammonia suffers gradual decomposition, if it is not always most carefully guarded from exposure to the air, which is scarcely practicable,—evolving neutral carbonate, and leaving a white powder of bicarbonate of ammonia, which renders the solution too weak.

History.—Ordinary carbonate of ammonia consists of two equivalents of oxide of ammonium, and three equivalents of carbonic acid $=2\,NH_4\,O+3\,CO_2$; the acetic acid drives out and replaces the carbonic acid. 1475 parts of carbonate of ammonia require 1276 parts of anhydrous, or 3544 parts of acetic acid containing 64 per cent. of water. The carbonic acid can only be entirely driven off by heat, which must not however be too great, otherwise acetate of ammonia will be volatilized.

Liquor Ammonia Acetatis is colorless, has a faint smell of acetic acid and ammonia, a feeble saline and somewhat bitter taste, in which that of ammonia is perceptible. This taste of ammonia, which is also perceptible in other salts of this base having a neutral reaction, is caused by the free or feebly combined soda in the saliva combining with the acid and evolving the ammonia. It should not be kept any considerable time, as it undergoes decomposition, and should be made only in small quantities at a time. At a gentle heat it must entirely volatilize. It is liable to all the impurities named under the heads of acetic acid and carbonate of ammonia. By evaporating it in vacuo, over sulphuric acid, deliquescent crystals of the acetate are obtained. If the solution be colored, this may generally be removed by filtering it through animal charcoal. If quite neutral, neither litmus nor turmeric papers will be affected by it. The tests of its impurities are the same as named in aqua ammonia, and carbonate of ammonia. Good Liquor Ammoniæ Acetatis yields soluble crystals of acetate of silver with nitrate of silver; evolves ammoniacal gas if lime or potassa be added to it; and vapors of acetic acid if sulphuric acid be added to it. Sesquichloride of iron forms a red liquor with it, the peracetate of iron. Liquor Ammoniæ Acetatis is *incompatible* with the alkalies, strong acids, corrosive sublimate, nitrate of silver, metallic sulphates, lime-water, alum, chloride of calcium, magnesia and some of its salts, etc. If the solution of acetate of ammonia be kept ready prepared in the shop, it should be left slightly acidulated; and when dispensed, a small particle of carbonate of ammonia should be added to impregnate it anew with the carbonic acid gas which exhales upon standing.

Properties and Uses.—In small doses this solution is regarded as a refrigerant; in large doses diaphoretic and diuretic. The diuretic influence is more obvious when the patient is kept cool; the diaphoretic, when he is kept warm. It is principally used in fevers and inflammatory affections, and is frequently associated with opium, tincture of camphor, nitrate of potassa, etc. Its diuretic influence is more marked when combined with sweet spirit of nitre. Applied on cloths, moistened with it, it has been found useful in hydrocele and mumps. Four parts of the solution added to twenty-eight parts of rose-water and one part of tincture of opium, form a very excellent collyrium in some chronic inflammations of the eye. Its dose is from two fluidrachms to a fluidounce in some sweetened water, and which may be repeated every three, four, or six hours.

Mr. W. S. Merrell recommends the following preparation as an elegant and pleasant anodyne, and diaphoretic in fevers, worthy the notice of the profession; he calls it *Liquor Ammon. Acetat. et. Morphiæ*: Take of Solution of Acetate of Ammonia *one fluidrachm;* Acetate of Morphia *one grain;* Syrup of Lemon *one fluidrachm;* mix together. The dose is from half a fluidrachm to a fluidrachm, to be taken in water. Each fluidrachm contains one-eighth of a grain of acetate of morphia.

Off. Prep.—Lotio Ætheris Composita.

AMMONIÆ VALERIANAS. *Valerianate of Ammonia.*

Preparation.—Place a thin layer of pure Monohydrated Valerianic Acid in a flat capsule, completely closed by a bell-glass, and admit Anhydrated Ammoniacal Gas until the acid is completely saturated. It is to be kept in small quantities in completely closed vessels.

Valerianate of Ammonia thus prepared forms in pearl-white tufts of acicular crystals radiating from a center, which have an odor resembling valerianic acid, but less disagreeable, a sweet taste, are neutral, isomorphous, assuming a distinct change in color and crystalline structure upon slight exposure to the air, and so deliquescent that it soon becomes liquid upon continued exposure to atmospheric moisture. Its chemical action is greatly increased by solution, but not its physical. The article used in medicine is a solution of the Valerianate, for which several formulæ have been given, as—

1. Take of Monohydrated Valerianic Acid, *an ounce* (Troy); carefully saturate this by adding gradually Caustic Solution of Ammonia, *a sufficient quantity;* when the mixture becomes neutral to test-paper, add Simple Syrup, flavored with Oil of Gaultheria, *a sufficient quantity* to make the whole amount to one pint. Each fluidrachm is equivalent to a little over four grains of Valerianate of Ammonia.—*F. Stearns.*

2. Take of Distilled Water *thirty-two drachms;* Valerianic Acid *one drachm;* Subcarbonate of Ammonia *a sufficient quantity* to neutralize the acid; then add Alcoholic Extract of Valerian *two scruples.*—*Declat.*

3. Take of Crystals of Valerianate of Ammonia *two drachms;* Extract of Valerian *two scruples;* Fluid Extract of Valerian *two fluidrachms;* Syrup of Orange-flower *half a fluidounce;* Distilled Water *seven and a half*

fluidounces. Make a solution and filter. This makes a solution of the Valerianate for internal use.

The composition and properties of Valerianate of Ammonia are not accurately ascertained, and the different specimens obtained are far from being uniform. The preparation formed for internal administration by the formula of Declat is of a brown color, not very limpid, and of a valerianic odor and taste.

Properties and Uses.—This salt has been highly recommended in neuralgia, epilepsy, headache, nervous irritability, chorea, etc. The dose of the salt is from four to ten grains three times a day; of Declat's solution, from a fluidrachm to half a fluidounce, according to the urgency of the symptoms.

AQUÆ MEDICATÆ.

Medicated Waters.

These consist of water holding in solution some medicinal or aromatic principles, as certain gases, volatile oils, etc. Heretofore, those waters which contained a portion of the aroma of certain plants, were procured by distilling water from either the fresh or dry herb; the principal portion of the volatile oil which collected on the top of the distillate upon standing, was removed, a sufficient amount being retained by the water to render it of the taste and odor of the plant. But such distilled waters are very apt to become spoiled, unless great care be taken to redistill them from time to time, or add to them some preservative material which is frequently an undesirable addition. It has, therefore, been found the best method to triturate the essential oil itself with certain substances in the water, which so minutely divide the former as to render it more soluble in the latter, as carbonate of magnesia, pumice stone, finely powdered glass or silica, etc., which yield a clear and permanent solution after being filtered through paper. Carbonate of Magnesia is the medium more commonly employed in this country. As ordinary water contains several agents which may decompose or ultimately destroy the aromatic virtues imparted to it by the above method, it is of much importance that distilled water only be always used.

AQUA ACIDI CARBONICI. *Carbonic Acid Water. Soda Water. Mineral Water. Artificial Seltzer Water.*

Preparation.—This is prepared by condensing Carbonic Acid Gas, generated by the action of Dilute Sulphuric Acid on pulverized Marble, by means of an apparatus manufactured for the purpose. Five or six volumes of gas may thus be condensed in one volume of water.

History.—At the ordinary temperature and pressure of the atmosphere, one volume of water absorbs one volume of carbonic acid gas, and acquires a sp. gr. of 1.0018. By doubling the pressure, the quantity of gas absorbed by the water is doubled, and so on for other degrees of pressure;

for Dr. Henry has shown that the quantity of gas forced into the water is directly as the pressure.—*P.* Thus, for water to absorb five times its bulk of this gas, a pressure of five atmospheres must be used.

The "soda water" of the shops is merely a carbonic acid water, rendered more palatable by the use of some aromatic or agreeable syrup; when the carbonated water and syrup are bottled up together, it is then known by the name of "mineral water." Water containing carbonic acid is very effervescent, has a pleasant, tingling, slightly acidulous taste, and an acid reaction. The vessels containing it should be strong, and perfectly air-tight, and kept in a cold place, otherwise the gas will escape, and the water lose its sparkling activity. Too much care can not be taken to avoid metallic impurities, especially lead, which is apt to be present when the liquid is drawn through leaden tubes. The first daily draught of carbonic acid water, from a fountain furnished with tubes of lead, should invariably be thrown away, as its use might give rise to unpleasant symptoms.

The *fixed air*, *acid vapor* and *aërial acid* of former times is now termed carbonic acid. It is an invisible, irrespirable gas, having a faint odor and a sharp, slightly acidulous taste. Its specific gravity is 1.5245, and it is so much heavier than air, that it may be poured from one vessel to another; it slightly reddens litmus; is not combustible, extinguishes most burning bodies; and is reduced to a limpid, colorless liquid under a pressure of 36 atmospheres at 32°, which is insoluble in water, and in the fat oils, but is soluble in all proportions in alcohol, ether, oil of turpentine and carburet of sulphur. When the pressure is removed from the liquid carbonic acid, the cold produced by the evaporation of one part is so great that another part freezes, forming a white, snow-like body, which is a bad conductor of heat, and has the temperature 148° F. Mixed with ether and placed under the exhausted receiver of an air-pump, Faraday obtained a temperature of 166° F. The metallic, alkaline, and earthy salts formed with carbonic acid are called *carbonates.* If a light be introduced into a well, pit, mine, or other place, it will burn dimly or be extinguished if this gas be present, and the air of such place will certainly destroy life if respired. The sparkling and effervescing properties of many kinds of wine, beer, cider, etc., are owing to the presence of carbonic acid gas. When carbonic acid has accumulated in cellars or other places, so as to render them fatal to animal life, it may be removed by sprinkling about some *liquor ammoniæ;* this combines with the carbonic acid to form carbonate of ammonia, and fresh air rushes in to fill up the space produced by the condensation of the acid. The formula of carbonic acid is CO_2; its equivalent weight, 22.

Properties and Uses.—Carbonic acid water is a refreshing, refrigerant beverage, useful to allay thirst, check nausea, and promote diuresis. may be used in fevers, inflammatory diseases, chronic inflammation of the stomach, vomiting of pregnant females, etc.; and may be taken three or four times daily in doses of from three to six fluidounces. Carbonic acid gas has been used with success in scrofulous ophthalmia, being directed upon the affected part in a small jet; it has also been directed upon the uterus and upper part of the vagina in dysmenorrhea and ulceration of the cervix; passed into the rectum it has been found useful in ulceration of the rectum and dysentery; and in cancerous and other ulcers it forms a good application. The jet should be continued from three to ten minutes upon the affected part, repeating it four or five times a day.

In accidents arising from its inhalation, remove the patient immediately into the open air, and place him on his back with his head somewhat elevated, and pursue a treatment similar to that named in poisoning by the inhalation of sweet spirit of nitre.

AQUA AMMONIÆ. (*See Ammoniæ Liquor.*)

AQUA AMYGDALÆ AMARÆ. *Bitter-Almond Water.*

Preparation.—Triturate together Essential Oil of Bitter Almonds *five minims*, with Carbonate of Magnesia *nineteen grains*, and gradually add, while continuing the trituration, Distilled Water, *twenty-four fluidounces;* filter.

History.—This medicated water soon undergoes decomposition, on which account, it should only be prepared as required, and never in large quantities. It is a sedative, of the character of hydrocyanic acid, and is preferable to the distilled water of bitter almonds, which is more dangerous in its effects upon the system.

Properties and Uses.—Bitter-Almond Water may be used in all cases where hydrocyanic acid or its sedative compounds are useful, as in hooping-cough, pulmonary affections, etc. It is more commonly used as an addition to other medicines to impart its peculiar flavor to them. The dose of it, when freshly made, is two fluidrachms, which may be carefully and gradually increased to six or eight fluidrachms, and which may be repeated two or three times daily.

AQUA CALCIS. *Lime-Water.*

Preparation.—"Take of Lime *half a pound;* Distilled Water *twelve pints*, Imperial measure. Slake the Lime with a little of the Water, pour the rest of the Water over it, and agitate. Then cover the vessel and put it aside for three hours. Preserve the liquor, with the remaining lime, in well-closed glass bottles, and use the clear liquid when wanted."—*Lond.*

History.—This is an aqueous solution, and may be made with any free-stone water, from springs, lakes, etc., instead of distilled water, provided these are free from impurities. As lime is more soluble in cold than hot water, the former should be used in making this preparation. Lime-water is a clear, transparent fluid, having a slightly earthy odor, and an alkaline, unpleasant and somewhat astringent taste and alkaline reaction. It partially saponifies oils; is not affected by sulphuric acid; and on exposure to the air, absorbs carbonic acid, which, forming carbonate of lime, is first seen floating as a film on the surface of the fluid, being finally deposited on the sides and bottom of the vessel, and succeeded by another film, and so on. Bottles containing it should always have an excess of lime, and be kept well-stopped.

Properties and Uses.—Lime-water has been found useful in pyrosis, gastrodynia, and other painful gastric symptoms due to deranged digestion, likewise in epilepsy, and other spasmodic and chronic diseases which are accompanied with acidity of the stomach. In dyspepsia, phthisis, and other forms of disease, where from acidity or irritability of the stomach the usual food is rejected, or if retained gives rise to uneasiness and many unpleasant symptoms, one part of Lime-water added to one, two, or three parts of good sweet-milk, will be found useful as an antacid, calmative, and diet. A tablespoonful of Lime-water will often allay troublesome vomiting. Lime-water has proved beneficial as an astringent in chronic diarrhea and dysentery, and diabetes, especially when given in combination with a decoction of white-oak bark. It is sometimes used in combination with wormseed oil, or other fluid anthelmintics, for the removal of worms; and will be found more especially efficacious in cases attended with great acidity. It has been advantageously used as an injection in gleet, gonorrhea, leucorrhea, ulceration and increased discharges from the bladder, etc. Externally, it has been employed as a wash in various affections of the skin, as scabies, prurigo, lepra, psoriasis, and ringworm of the scalp, also in scrofulous and indolent ulcers. Mixed with linseed oil, it forms a calcareous soap or liniment, the oleo-margarate of lime, which is very valuable in scalds and burns; oil of turpentine is sometimes advantageously added to it. Lime-water should not be given during the presence of active inflammation; nor should its use be too long continued, as it weakens the stomach and digestive powers. Its dose is from half a fluidounce to four fluidounces, and may be taken alone, in milk, or in some aromatic water. An overdose occasions unpleasant symptoms, which are best combated by bland and mucilaginous fluids.

Off. Prep.—Linimentum Calcis.

AQUA CAMPHORÆ.—*Camphor Water.*

Preparation.—Triturate Camphor *one drachm*, with Alcohol *twenty minims*, then add Carbonate of Magnesia *two drachms*, and continue the trituration, gradually adding Distilled Water *one pint;* when the whole mixture has been thoroughly triturated, filter.

History.—By the above process one fluidounce of water is made to contain over three grains of camphor. The first trituration with alcohol by destroying the tenacity with which the particles of camphor adhere together, renders it more readily pulverable; the second trituration with the magnesian salt subdivides it still more finely, so that the water can more readily act upon it, and produce the desired medicated water. The filtration removes the magnesia from the solution.

Properties and Uses.—Camphor Water is a very feeble preparation of camphor, and is principally used as a vehicle for the administration of some other remedies. It has, however, been useful in the typhoid stage of febrile diseases to produce sleep and quietness, also to relieve severe after-pains, and in all cases where small doses of camphor are indicated. Its dose varies from half a fluidounce to two fluidounces, every one, two, or three hours, as circumstances require. Externally, it has been found useful in chronic ophthalmia, in combination with rose-water, infusion of golden seal, etc.

Off. Prep.—Mistura Camphoræ Composita.

AQUA CINNAMOMI. *Cinnamon Water.*

Preparation.—Triturate Oil of Cinnamon *fifteen minims*, with Carbonate of Magnesia *half a drachm*, continue the trituration, gradually adding Distilled Water *one pint;* when the whole mixture has been thoroughly triturated, filter.

Properties and Uses.—Cinnamon Water is useful in passive hemorrhage from the lungs, stomach, kidneys, or uterus, in chronic diarrhea and dysentery, and in flatulency. It is frequently employed to cover the unpleasant taste of other remedies, and will often allay vomiting. Its dose is from two fluidrachms to two fluidounces. It should not be used when fever or inflammation is present.

AQUA DESTILLATA. *Distilled Water.*

Preparation.—"Take *ten gallons* of Water (place it in a clean retort, kept only for this purpose); first distill *two pints*, and reject them; then distill *eight gallons*, and keep the water in a glass vessel."—*Lond.*

History.—Distilled Water, although not a medicated water, is introduced here, partly to avoid a separate place for it, and partly on account of its extensive employment in the preparation of medicated waters. For medicinal purposes, Distilled Water should remain unchanged on the addition of any of the following tests: "Lime-water, solutions of oxalate of ammonia, acetate of lead, chloride of barium, nitrate of silver, sulphureted hydrogen, and soap. If turbidness, milkiness, or precipitate, be occasioned by any of these, we may infer the existence of some impurity in the water. But water which has been repeatedly distilled gives traces of acid and alkali when examined by the agency of voltaic electricity, which, therefore, is the most delicate test of the purity of water. Distilled Water also usually contains traces of organic matter. Nitrate of silver is the most sensible test of its presence; a solution of this salt in pure water, preserved in a well-stoppered bottle, undergoes no change of color by exposure to light; but if any vegetable or animal matter be present, the metal is partially reduced, and the liquid acquires a dark or reddish tint."—*P.* In many pharmaceutical and chemical processes, Distilled Water is very essential, while in others pure spring or river, or rain water will be sufficient. The reason for throwing away the first two pints of water which are distilled over, is, that any volatile principles which may be present, as ammonia, carbonic acid, etc., and which pass over with the first portions, may be removed. For the properties and uses of water, see *Aqua* in part I.

AQUA MENTHÆ PIPERITÆ. *Peppermint Water.*

Preparation.—This is prepared in the same manner as Cinnamon Water on page 1041, using Oil of Peppermint, instead of Oil of Cinnamon.

Properties and Uses.—Peppermint Water is used as an antispasmodic and carminative, in flatulence and flatulent colic, to allay nausea and vomiting, and as a gentle aromatic stimulant. The dose is from four fluidrachms to two fluidounces, three or four, or more times a day.

Off. Prep.—Mistura Camphoræ Composita.

AQUA MENTHÆ VIRIDIS. *Spearmint Water.*

Preparation.—This is prepared in the same manner as Cinnamon Water on page 1041, using Oil of Spearmint, instead of Oil of Cinnamon.

Properties and Uses.—Similar to those of peppermint water, to which some persons prefer it. The dose is also the same.

Off. Prep.—Mistura Camphoræ Composita.

AQUA PICIS LIQUIDÆ. *Tar Water.*

Preparation.—Take of Tar *two pints*, Boiling Water *a gallon.* Mix together, and stir with a wooden rod for fifteen minutes. When cold, and the tar has subsided, strain the liquor and keep it in well-stopped bottles.—*Dub.*

Properties and Uses.—Tar Water has a Madeira-wine color, and a sharp empyreumatic taste; it reddens litmus, but does not effervesce with carbonate of potassa, though it becomes more darkly colored. Persulphate of iron blackens it. It consists of water, holding in solution acetic acid, resin, and pyrogenous oil. It exerts a mild influence on mucous membranes, and hence has been found useful in chronic catarrhal and urinary affections in doses of one or two pints daily. Sometimes, Tar Water is prepared in pulmonary affections, as above named, with the addition of Honey *two pints.* Externally it has been found useful as a wash in diseases of the scalp, and other chronic affections of the skin.

AQUA PIMENTÆ. *Pimento Water.*

Preparation.—Take of Pimento, bruised, *one pound;* Alcohol *three fluidounces*, Imperial measure; Water *two gallons*, Imperial measure. Mix them, and distill off one gallon.—*Lond.*—*Ed.* Or, it may be prepared in the same manner as Cinnamon Water on page 1041, using Oil of Pimento, instead of Oil of Cinnamon.

Properties and Uses.—Used in flatulency, and weak digestion, in doses of a fluidounce or two.

AQUA HEDEOMÆ PULEGIOIDES. *Pennyroyal Water.*

Preparation.—Triturate Oil of American Pennyroyal *half a fluidrachm*, with Carbonate of Magnesia *a drachm*, then with Distilled Water *two pints*, to be gradually added; finally, filter through paper.

Properties and Uses.—Pennyroyal Water may be used as a substitute for, and in the same doses as peppermint and spearmint waters, to which some persons prefer it.

AQUA ROSÆ. *Rose-water.*

Preparation.—"Take of the petals of Damask Rose (*Rosa Centifolia*) *ten pounds;* Water *two gallons;* Alcohol *three fluidounces*; mix them, and distill off a gallon. The petals should be preferred when fresh; but it also answers well to use those which have been preserved, by beating them with twice their weight of chloride of sodium."—*Ed.*

History.—When thus prepared, Rose-water is very fragrant and clear; but it decomposes when kept for a long time, especially if exposed to the action of light and air. It may also be prepared in the same manner as pursued for cinnamon water, using oil of roses instead of oil of cinnamon; or, by distilling water from the oil of roses.

Properties and Uses.—Rose-water forms an agreeable, cooling, unirritating, and slightly astringent collyrium, which is useful in many affections of the eye; it is also added to lotions, washes, etc., to impart an agreeable perfume.

Off. Prep.—Confectio Rosæ; Linimentum Terebinthinæ Compositum; Lotio Ætheris Composita; Lotio Sassafras; Unguentum Aquæ Rosæ.

AQUA SAMBUCI. *Elder-Flower Water.*

Preparation.—To Fresh Elder Flowers *ten pounds*, add Water *two gallons*, distill one gallon (Imperial measure).—*Lond.* But little oil is contained in Elder Flowers; the water distilled from them is sometimes used in collyria and other lotions.

N. B. Medicated waters are frequently made by adding to a *few pounds* of the leaves or flowers of the article required, *six or seven fluidounces* of proof-spirit, and *two gallons* of water; from which one gallon is distilled. In this way was formerly obtained nearly all of these preparations, but the processes given above are now esteemed the best. Aqua Florum Aurantii, *Orange-Flower Water*, Aqua Fœniculi, *Fennel Water*, Aqua Menthæ Piperitæ, *Peppermint Water*, Aqua Menthæ Viridis, *Spearmint Water*, together with several others, may be procured from the plant or flowers, by the mode of distillation just referred to.

CATAPLASMATA.

Cataplasms.

Cataplasms, ordinarily called "poultices," are preparations applied to an external part for the purpose of producing relaxation, keeping up moisture, and allaying pain and inflammation. They are usually composed of substances capable of absorbing considerable fluid, and are applied either cold or warm, in a moist state. They should not be made so thin as to flow over the parts adjacent to their application, nor so thick as to become dry too rapidly; neither should they be composed of substances which stick too tenaciously to the skin and are not readily removed by water, nor of hard bodies. They should always be removed without being permitted to dry. Owing to the affections for which they are applied, and their influences upon these, they have received the several names of emollient, discutient, refrigerant, stimulating, etc. When applied to ulcers, tender and irritable parts, etc., it is customary to cover their surfaces with a little olive oil, in order to prevent their adhering to such parts. Poultices are commonly prepared by nurses, but medical men and druggists should be acquainted with their method of preparation.

Spongio-piline is sometimes applied to parts to absorb excessive moisture, or to prevent evaporation. It is a thick cloth composed principally of sponge, one side of which is applied to the skin in a wet or dry state, according to the action required; the other side being coated with some water-proof varnish.

CATAPLASMA CARBONIS. *Charcoal Cataplasm.*

Preparation.—Macerate Bread *two ounces*, with Water *ten fluidounces*, for a short time near the fire; then gradually add and mix with it Powdered Flaxseed *ten drachms*, stirring so as to make a soft cataplasm. With this mix powdered Charcoal *two drachms*, and when prepared for application, sprinkle *one drachm* of Charcoal on the surface of the cataplasm.—*Lond.*

Properties and Uses.—Charcoal, properly prepared, has the property of removing the fetid odor evolved by gangrenous and phagedenic ulcers, for which the above cataplasm is designed. It should be renewed two or three times in every twenty-four hours. As an antiseptic, however, charcoal is inferior to the hypochlorites (chlorides) of lime, and soda.

CATAPLASMA DAUCI. *Carrot Cataplasm.*

Preparation.—Take of Garden Carrots, scraped, *four ounces*, Indian-meal *one ounce*, Boiling Water a *sufficient quantity* to form a cataplasm of the proper consistence.

Properties and Uses.—This will be found a valuable application to indolent and gangrenous ulcers, and painful tumors.

CATAPLASMA FERMENTI. *Yeast Cataplasm.*

Preparation.—To *half a pint* of Milk, tepid, add Yeast *two fluidounces*, and fine Slippery-Elm bark a *sufficient quantity* to form a cataplasm of the proper consistence.—*Beach's American Practice.*

Properties and Uses.—This is valuable as an antiseptic application. It will be found especially serviceable in gangrenous and phagedenic ulcerations; it destroys the fetor, often checks the sloughing, and assists the separation of the dead parts. It should be renewed two or three times a day.

CATAPLASMA LINI. *Flaxseed Cataplasm.*

Preparation.—To Boiling Water *ten fluidounces*, add gradually, Powdered Flaxseed *four ounces and a half*, or *a sufficient quantity;* stir constantly, so as to make a cataplasm.—*Lond.*

Properties and Uses.—This is a valuable emollient cataplasm, to allay pain, inflammation, and favor suppuration. It is used for similar purposes with the elm poultice.

CATAPLASMA LOBELIÆ. *Lobelia Cataplasm.*

Preparation.—To *equal parts* by weight of Powdered Lobelia and fine Elm bark, add a *sufficient quantity* of weak Ley, warm, to form a cataplasm.

Properties and Uses.—This forms an excellent application to felons, white-swelling, wounds, fistula, inflammation of the breast and other parts, stings of insects, erysipelatous inflammations, and painful swellings or ulcerations. It should be frequently renewed.

CATAPLASMA OXYCOCCI. *Cranberry Cataplasm.*

Preparation.—Take of ripe Cranberries *any quantity*, and bruise them to form a cataplasm.

Properties and Uses.—Applied around the throat in quinsy, and in swelling of the glands of the throat in scarlatina and other diseases, I know of no more useful agent; its action is very prompt, relieving in a few hours. It has been likewise reputed useful in cancerous ulcers, erysipelatous inflammations, and gouty rheumatism.

CATAPLASMA PHYTOLACCÆ. *Poke-root Cataplasm.*

Preparation.—Place fresh Poke-root in hot ashes to roast, when sufficiently done, mash it and form a cataplasm.

Properties and Uses.—This may be applied to all kinds of tumors in order to discuss them; or if they be too far advanced, it will hasten suppuration. In the latter instance its action is accompanied with much pain. It is especially valuable in tumors of an indolent character, as buboes. It should be renewed two or three times a day.

CATAPLASMA STRAMONII. *Stramonium Cataplasm.*

Preparation.—Take of the fresh leaves of Stramonium, *any quantity*, bruise them, and add a small quantity of hot water to form a sufficiently moist cataplasm.

Properties and Uses.—I have found this a decidedly efficacious application in peritoneal inflammation, the whole abdomen is to be covered with it; likewise in acute rheumatism, and in gastro-intestinal inflammations. Applied to the perineum in enlargement of the prostate, for the purpose of securing the passage of the catheter in case of retention of urine, when it can not otherwise be entered into the bladder, I know of no better agent—it should remain on the parts about an hour before attempting the introduction of the catheter. It will be found valuable in all rheumatic or neuralgic pains.

CATAPLASMA ULMI. *Elm Cataplasm.*

Preparation.—Take of Powdered Elm-bark, a *sufficient quantity;* stir it in hot Water, or Milk and Water, to the consistence of a cataplasm.—*Beach's Am. Prac.*

Properties and Uses.—This cataplasm is of almost universal application, and is superior, in many respects, to every other. As an application to painful swellings, inflammations, ulcerations, and to facilitate the separation of the slough produced by caustics, and for various other purposes, it stands, and justly, too, in high repute among American physicians.

CERATA.

Cerates.

Cerates are agents intended for external application, and are composed of wax, or spermaceti, combined with fatty matters, and with which resins, powders, etc., are frequently amalgamated. The articles entering into their composition should always be pure, especially the fats, as these preparations are very prone to rancidity; the addition of benzoic acid tends to prevent this change, but its presence is not always desirable. Prof. E. S. Wayne finds that by substituting paraffine for the wax, in cerates and ointments, the disposition to decompose is effectually prevented. Cerates are firmer in consistence than ointments, and are intended more as a sort of plaster than for inunction. In the preparation of cerates the water-bath will be found preferable to a direct exposure to the fire; and, to effect the fusion of the materials, a very moderate heat will be sufficient. During the cooling of the compound it should be constantly and thoroughly stirred, not permitting one part to solidify before another. Cerates should be made in small quantity at a time, and should be kept in a cool place, in jars closely covered with tin foil, so as to exclude the air as much as possible. It is very likely that the use of wax in these preparations will be entirely superseded by paraffine, which does not become rancid.

CERATUM CALAMINÆ. *Calamine Cerate. Turner's Cerate.*

Preparation.—Take of Prepared Calamine *one ounce;* Simple Cerate *five ounces;* mix them well together.—*Ed.*

Or, take Prepared Carbonate of Zinc, Wax, of each, *half a pound;* Olive Oil *sixteen fluidounces* (Imperial measure). Melt the Wax in the Oil, remove them from the fire, and as soon as the mixture begins to concrete, add the Carbonate of Zinc, and stir briskly until they be cold.—*Lond.*

Properties and Uses.—This cerate is an excellent desiccant and astringent application to burns, scalds, erysipelatous ulcerations, chafings, etc. —*P.*

CERATUM CETACEI. *Spermaceti Cerate.*

Preparation.—"Take of Olive Oil *six parts;* White Wax *three parts;* Spermaceti *one part.* Heat the Oil gently; add the Wax and Spermaceti; stir the whole briskly when it is fluid, and continue the agitation until it is cool."—*Ed.*

Properties and Uses.—Spermaceti Cerate is used as a mild and unirritating application to superficial ulcers, excoriations, blisters, etc.; more active ingredients are sometimes added to it.—*P.*

The following formula are given for lip-salve: *Red Lip-salve.*—Place in a vessel, Oil of Almonds *one pound;* Spermaceti, White Wax, Alkanet-root, of each, *two ounces.* Melt over a steam or water-bath, and allow the articles to digest on the Alkanet four or five hours to extract its color; then strain through fine muslin, and add *two drachms* of Oil of Roses, just before the mixture cools. Stir well together.

White Lip-salve.—Melt, as above, Oil of Almonds *four ounces*, with White Wax and Spermaceti, each, *one ounce;* when nearly cool, add Oil of Bitter Almonds *half a drachm;* Oil of Geranium *fifteen minims.* Stir thoroughly together. After Lip-salve is poured into pots, and has become cold, a red-hot iron must be held over it for a minute or so, in order that the heat radiated from the iron may melt the surface of the salve, and make it even and smooth.—*Am. Jour. Pharm.*, *XXVIII.*, 86.

Camphor Cold-cream is made by melting together Almond Oil, Wax, Spermaceti, of each, *one pound;* now pass, in a very small stream, of Rose-water *one pound*, agitating constantly till the whole is introduced and well incorporated, then add Powdered Camphor *two ounces;* Oil of Rosemary *one drachm.* *Rose Cold-cream* is made similarly of Almond Oil, Rose-water, each, *one pound;* White Wax, Spermaceti, each, *one ounce;* Oil of Roses *half a drachm.* *Camphor Ball* is made by melting together, Spermaceti *three drachms;* White Wax *four drachms;* Almond Oil *one ounce;* and then adding Powdered Camphor *three drachms.* *Camphor Ice* is made by melting Spermaceti *one drachm*, with Almond Oil *one ounce*, and adding Powdered Camphor *one drachm.*

CERATUM CROTONIS. *Croton-Oil Cerate.*

Preparation.—Melt Lard *five ounces*, with White Wax *one ounce*, and when nearly cool, add Croton Oil *two ounces*, and stir until cool.

Properties and Uses.—Croton-Oil Cerate is a rubefacient and vesicant, and may be used in all cases where such actions, or counter-irritation, are demanded.

CERATUM RESINÆ. (*Unguentum Resinæ Albæ.*) *Resin Cerate. Basilicon Ointment.*

Preparation.—"Take of Resin *five ounces*, Axunge (Lard) *eight ounces*, Beeswax *two ounces.* Melt them together with a gentle heat, and then stir the mixture briskly while it cools and concretes."—*Ed.* "Pass it through a fine sieve while it is hot."—*Lond.*

Properties and Uses.—This cerate forms a mildly stimulant, digestive, and detergent application to ulcers which follow burns, scalds, etc., or which are of a foul or indolent character, and also to blistered surfaces to promote a discharge.—*P.*

CERATUM SABINÆ. *Savin Cerate. Ointment of Savin.*

Preparation.—"Take of fresh Savin *two pounds;* Beeswax *one pound;* Lard *four parts.* Melt the Lard and Wax together, add the Savin, and boil them together till the leaves are friable; then strain."—*Ed.*

Or, *half an ounce* of the dried Savin leaves in fine powder, may be rubbed intimately with Ceratum Resinæ *four ounces.*

Mr. I. J. Grahame proposes the following as making a more eligible cerate than the formulæ in any of the pharmacopœias: Take of Lard *seven and a half ounces;* Resin *one and a half ounces;* Yellow Wax *three ounces;* Fluid Extract of Savin *two ounces.* Melt together the Lard

Resin, and Wax, and when nearly cold, having stirred it constantly, add the fluid extract, and continue the stirring to completion.

The *Fluid Extract of Savin* may be made thus: Take of finely powdered English Savin, prepared from recently dried leaves, *four ounces;* Alcohol (about 90 per cent.) *a sufficient quantity.* Pour on the Savin sufficient Alcohol to dampen the powder (ten drachms). Pack immediately in a suitable displacer, with considerable pressure, and having placed on the surface a piece of perforated paper, pour on the Alcohol, and when six fluidounces shall have passed, put aside for spontaneous evaporation, until reduced to three fluidounces—stirring frequently, meanwhile, facilitates the process. Continue the addition of the Alcohol until eight fluidounces more pass; reduce this by water-bath at a moderate temperature to one fluidounce, and mix it with the previous three fluidounces.—*Jour. and Trans. of Maryland Coll. of Pharm.*, 1858.

Properties and Uses.—Savin Cerate is applied to blistered surfaces, to maintain a constant discharge. It is less irritating than the cerate of cantharides, and has no tendency to excite strangury. When well prepared it has a fine green color, is uniform and transparent, without any tendency to separate, and has a smell like that of the plant.

CERATUM SIMPLEX. *Simple Cerate.*

Preparation.—Melt together Prepared Hog's Lard *four ounces*, and Bleached Beeswax *two ounces*, agitating the whole briskly until cool.

Properties and Uses.—Simple Cerate forms a mild and cooling application to irritated surfaces, wounds, excoriations, burns, blisters, etc. Mr. W. J. M. Gordon, Pharmaceutist of this city, has prepared a "Paraffin Cerate," which has been found a very useful article. It is composed of Paraffin *two drachms*, Oil of Almonds *half an ounce*, White Wax *one drachm*, Oil of Roses *two drops.*

CEREI. CEREOLI.

Bougies.

Preparation.—Bougies are made by dipping strips of soft linen cloth, rather wider at one end than at the other, into certain emplastic or elastic compositions, folding them closely, and rolling them firmly on a smooth slab. For elastic Bougies, pieces of catgut, bundles of thread, etc., are sometimes used. The following are some of the compositions held in most repute:

1. BELL'S.—Lead Plaster *four ounces;* Yellow Wax *one ounce and a half;* Olive Oil *three drachms.*

2. HUNTER'S.—Olive Oil *three pounds;* Yellow Wax *one pound;* Red Lead *one pound and a half;* boil together over a slow fire till combined.

3. SWEDIAUR'S *White.*—White Wax *one pound;* Spermaceti *three*

drachms; Acetate of Lead from *two drachms* to *one ounce;* boil together slowly.

4. PIDERIT'S *Wax.*—Yellow Wax *six parts;* Olive Oil *one part.*

5. GOULARD'S.—Yellow Wax *six ounces;* melted and mixed by stirring with Goulard's Extract of Lead from *two drachms* to *two ounces.*

6. ELASTIC.—Boiled Linseed Oil *twelve ounces;* Amber *four ounces;* Oil of Turpentine *four ounces,* in which is dissolved Caoutchouc *five drachms.* Melt and mix the articles well together, and spread the compound at three successive intervals upon a silk cord or web. Place the pieces, so coated, in a stove-oven heated to 150° F., and leave them in it for twelve hours, adding fifteen or sixteen fresh layers in succession, until the instruments have acquired the proper size. Polish first with pumice-stone, and finally smooth with tripoli and oil.

Bougies are usually employed for dilating strictures, as of the urethra, vagina, neck of the uterus, and rectum. The largest size that can be conveniently introduced is first used, and the size gradually increased as the treatment progresses. The wax bougie is often employed for obtaining the form of an urethral stricture, its location and distance from the external orifice.

CONFECTIONES.

Confections or Conserves.

CONFECTIO ROSÆ. *Conserve of Roses. Confection of Roses.*

Preparation.—Take of recent Petals of the Red Rose *a pound;* White Sugar *three pounds;* beat the rose Petals in a stone mortar; then, the sugar being added, beat them again until they are thoroughly incorporated.—*Lond.*

Or, the dried Petals finely powdered *one ounce,* may be rubbed with Rose-water at 150° F., *two fluidounces;* then gradually add powdered Refined Sugar *seven ounces;* pure Honey *an ounce and a half.* Beat the whole together in a stone or marble mortar into a uniform mass.

Properties and Uses.—This preparation is much used as a common pill basis for sulphate of quinia, and other medicines. Its astringency is very weak. It has no tendency to mold, ferment, or become candied.

CONFECTIO SENNÆ. *Confection of Senna. Electuary of Senna. Lenitive Electuary.*

Preparation.—Pulverize together Senna *eight ounces,* and Coriander Seed *four ounces;* sift out ten ounces of the powder. Boil the residue in Water *three pints and a half,* together with Figs *a pound,* and fresh Liquorice-root, bruised, *three ounces;* reducing the Water to two pints. Then express and strain the liquor, and evaporate it down to twenty-four fluidounces. Dissolve in this Refined Sugar *two pounds and a half,* and to the syrup thus formed add Pulps of Prunes, of Tamarinds, and of Cassia Fistula, each, *half a pound;* to this mixture add the previously prepared ten ounces of powder, and triturate the whole carefully into a uniform mass.—*Lond.*

Properties and Uses.—When correctly prepared, this confection is a pleasant, mild, and very effectual purgative, useful during pregnancy, and for patients afflicted with costiveness, hemorrhoids, or diseases of the rectum. The dose is from one to three drachms, or more.

Off. Prep.—Confectio Sennæ Composita.

CONFECTIO SENNÆ COMPOSITA. *Compound Electuary of Senna.*

Preparation.—Take of Confection of Senna *one ounce;* Bitartrate of Potassa *half an ounce;* Pulverized Jalap *three drachms;* Nitrate of Potassa, Flowers of Sulphur, each, *two drachms;* Extract of Butternut *a sufficient quantity* to form into a mass of pilular consistence.

Properties and Uses.—This confection has been used with advantage in constipation, and in hemorrhoids of whatever form. Twelve or sixteen grains may be taken for a dose, in pill form; repeating it twice every day, so as to act mildly on the bowels.

DECOCTA.

Decoctions.

The solution procured from the various parts of plants, by boiling them in water, is called a Decoction. Decoctions are generally prepared from those articles which do not readily yield their active constituents to water at a temperature below 212° F.; yet it must be remembered, that as most plants contain starch, gum, and other inert matters, which are readily soluble in water, these will generally be found associated with the remedial principles in a decoction. Medicines containing volatile principles, or principles which are changed into insoluble and inert matters at a boiling heat, should never be subjected to decoction. As a general rule, decoctions should never be employed or prescribed, because, since the introduction of infusion by displacement, the virtues of nearly all medicinal plants can be obtained by reducing them to a fine powder, and carefully percolating with water at temperatures varying from 60° to 200° F., according to the solvent nature of the active principle.

When, however, decoction is determined upon, the medicinal ingredients should be sliced, bruised, or powdered, according to their character, and laced in an earthenware, glass, or iron vessel of suitable size, the latter being lined internally with porcelain. In most instances, tin vessels may e employed, but copper, brass, iron, zinc, or glazed earthenware vessels on account of their liability to oxidation, or incompatibility with some of the active principles, as tannic acid with iron, etc., are apt to prove injurious, and should not, therefore, be used. The water employed should be pure and clear, and the boiling should not be carried on for too long a period. During the boiling the vessel should be kept covered, so as to exclude as much as possible the presence of air, the action of which is very apt to materially impair the medicinal principles held in solution. The boiling finished, the decoction should be strained before it becomes cool.

In decoctions where several articles are employed, the whole should not be placed in at once, but each article should be placed in the boiling water at periods adapted to the time required to obtain its properties by the operation of boiling, or, in other words, according to its degree of solubility. Some plants require to be boiled for some minutes, while others will yield all their virtues if added during the middle, or toward the termination of the process. Volatile agents should be added after the decoction has been removed from the fire, and strained while boiling hot; and then it should be kept closely covered until cold.

Decoctions are very seldom ordered from the apothecary, but almost always are made a matter of domestic management; hence, a list of decoctions is omitted as unnecessary, an explanation of the general rules relative to them being deemed sufficient. The ordinary mode of preparing decoctions, with physicians, is to allow one ounce of the article used to one pint of water, and the dose of which is from one to four fluidounces, depending on the activity of the agent, or the physiological effect which is required. Where the proportions are different from these, it will be referred to in the description of the properties and uses of the article.

From various influences, decoctions are very liable to speedy change or decomposition; consequently they should be made in small quantities, whenever required, and never used after becoming two days old, especially in hot weather.

EMPLASTRA.

Plasters.

Plasters are designed to be applied upon the skin or surface of the body; they are of much thicker consistence than cerates, require a certain degree of heat to soften them sufficiently for spreading, and are very adhesive when applied to any part of the body, if its temperature be of an ordinary character. They are intended to fulfill four indications, viz.: o give mechanical support or pressure to certain parts; to hold cut surfaces in approximation; to protect parts from atmospheric action; and to produce sedative, stimulant, or other therapeutical influences, according to the nature of the medicines associated with them. They are most usually composed of resins combined with wax, fats, and other substances, and requently in combination with the oleo-margarate of lead or lead-plaster as a basis. Plasters should be prepared in some metallic vessel, as tin, or iron, and which, in consequence of the swelling many articles undergo when heated, thereby augmenting their volume, should be considerably larger than that required to hold the components of the plaster when in an unmelted condition; the temperature used in making them should not be too high, and, instead of exposing the vessels containing them to a direct fire, a water-bath should be used, which will prevent them from becoming carbonized. The heat should be continued no longer than is necessary to effect the proper amalgamation of the ingredients; and those of a volatile character should be added at as late a period during the cooling of the plaster as is consistent with their intimate combination with it. After having melted wax, resinous substances, etc., together, they should be strained while hot, to remove impurities, and, as the several articles required to form the plaster are added, the mass should be well stirred. Some plasters require to be stirred constantly till cold, while others are poured into cold water, during their melted state, and worked by the hands, kneading them until nearly cold, and then forming them into cylindrical rolls, or long square sticks, of various dimensions to suit the views of the operator. The cylinders are usually made by rolling portions of the plaster on a hard, smooth surface, kept constantly moist during the operation. If some of the components of a plaster are soluble in water, the Plaster should not be worked in this fluid, but be allowed to cool either in the vessel in which it is prepared, or in pans or cylinders made for the purpose. When cooled in tin or iron pans, it is usually divided into long square sticks. As the action of the air exerts an influence upon plasters, it is advisable to cover them with paper, tin-foil, or other material, in order to protect them as much as possible against this influence; and they should always be kept in dry and cool situations. Plasters should be solid and not adhesive, at atmospheric temperatures; and should become, not too soft, but very flexible and tenacious when exposed to the natural heat of the body. When a plaster softens under ordinary atmospheric warmth, it should be remelted, and more resin, or other of its solid constituents be added; if it is too firm, not being readily spread at a moderate heat, or not sufficiently adhesive when in contact with the body, a sufficient quantity of olive oil should be added upon remelting it.

Plasters are spread upon various materials in accordance with the object for which they are used. If they are designed to act as mechanical supports, to exclude atmospheric air, etc., white sheepskin is the best material; if they are to be applied to ulcers, to surfaces exposed by the removal of the skin, or to wounds for the purpose of holding the divided surfaces in close contact with each other, some softer material may be used, as muslin, etc. Sometimes oil, silk, or india-rubber cloth is employed, and where economy is desired, they are spread on stout paper. The spreading of plasters may be much facilitated by the druggist having tin or pasteboard frames of various sizes and shapes suited to the several parts of the body to which they may be applied, each one having a central aperture of the required figure; the tin-frame being laid upon the leather, the plaster is spread upon that part of it exposed by the central aperture. Some druggists after cutting the leather somewhat larger than that of the size desired, paste strips of paper, about half an inch wide, along the edges of the leather, and remove them, after having spread the plaster within the space which they inclose. The plaster should be spread thinly and evenly, always leaving an unspread edge or border, half an inch wide, which serves to protect the linen worn over it from adhering to it. There are various modes of spreading the plaster; some melt the plaster in a suitable vessel over a gentle fire, and spread it by means of a common spatula; others, use an iron instrument made expressly for the purpose, which when properly heated, they apply to the plaster; as this melts, the fused portion is dropped upon various parts of the leather, and the spreading is accomplished by carefully passing the same heated iron over the surface, carrying portions of the melted plaster along with it. A very excellent contrivance has been invented by Mr. Boggett, of England. It consists of an iron instrument somewhat similar to the one referred to above, the handle and body of which is hollow, or have a tube passing through them. To the orifice at the end of the handle is attached one end of a movable or portable gutta-percha or other tube, the other end of which is attached to a gas-burner, the same as with portable gas-burners. The body or spatula part of the instrument has its *upper surface* perforated by a number of small holes, its *under surface* being smooth for spreading. Upon allowing the gas to flow along the tube into the spatula, it passes out through the small holes referred to; by igniting it at these points, the spatula is readily heated to the temperature required for spreading. The size of the flame and the heat of the spatula can be regulated by the stop-cock attached to the gas-burner. Thus the heat can be kept up constantly during the operation of spreading, with but very little trouble. Care must be taken not to heat the irons employed in spreading to too great a degree, else certain parts of the plaster may become volatilized or decomposed. When it is desired to obtain quantities of plasters, they are spread by machines made for the purpose, for an account of which the reader is referred to "Procter's Mohr and Redwood on Pharmacy."

EMPLASTRUM ACONITUM. *Aconite Plaster.*

Preparation.—Take of Aconite root, in coarse powder, *four ounces*, moisten it with *six fluidounces* of Alcohol, and permit it to macerate twenty-four hours; then put it in a displacer, and pour on gradually Alcohol a *sufficient quantity* to make a pint of tincture. Distill off three-fourths of the Alcohol, evaporate the residue on a water-bath to a thick, syrupy consistence, then add Lead Plaster (Emp. Resinæ), in a melted state, *three ounces and a half*, and stir constantly until it is properly incorporated with the soft resinous extract, and cools.

History.—This forms a brown, homogeneous mass, weighing about four Troy ounces. It should, when used, be spread in a thin layer on skin or oiled-silk, and may be used several times when its application has not been too long continued at first.

Properties and Uses.—It possesses the medicinal efficacy of the root, and has been found a valuable application in neuralgia, headache, rheumatic pains, painful tumors of the breast and other parts, and in inflammatory dysmenorrhea.—*W. Procter, jr.*

EMPLASTRUM ARNICÆ. *Arnica Plaster.*

Preparation.—Take of finely bruised Arnica flowers *one pound*, Troy, and pour over them *two pints* of a mixture of Alcohol, sp. gr. 0.835, *three pints*, Water *one pint.* Allow this to stand forty-eight hours, pack it in a percolator, and pour on slowly the remainder of the Alcohol and Water until *three pints* of Tincture are obtained. Evaporate this tincture in a water-bath or still, till reduced to a soft resinous extract (weighing about two ounces and a quarter), and incorporate it, by stirring, with melted Adhesive Plaster (Emp. Resinæ), *twenty-two ounces* Troy. The plaster is uniform in texture, has a deep yellow-brown color, spreads easily, and is adhesive.

Properties and Uses.—A stimulant, useful as an application to painful or sprained joints, chronic rheumatic pains, weak back, etc.—*Wm. Procter, jr.*

EMPLASTRUM BELLADONNÆ. *Belladonna Plaster.*

Preparation.—Take of Extract of Belladonna, *one ounce and a half*, form it into a uniform soft mass by trituration with a small quantity of Water or Alcohol. Add this to Resin Plaster, melted, *three ounces.*—*Ed.* This operation should be conducted in a Wedgewood, or porcelain mortar, which rests in water heated to 212° F., and the trituration should be continued until the plaster has become cool. By this means the Water or Alcohol is evaporated from the extract, which is equally diffused through the plaster.

Properties and Uses.—This is an anodyne and antispasmodic agent for the relief of syphilitic, rheumatic, neuralgic, and other pains. When applied to the sacrum it has afforded relief in dysmenorrhea. If it be heated too much in spreading, its properties will be much impaired.

EMPLASTRUM BELLADONNÆ COMPOSITUM. *Compound Plaster of Belladonna.*

Preparation.—Take of Resin Plaster *five ounces;* Extract of Belladonna *one ounce and a half;* Extract of Conium Maculatum *one ounce and a half;* Pulverized Iodine *two scruples.* Place the plaster in an earthenware mortar, and put this in hot water. When the plaster commences to melt, add the Extracts of Belladonna and Conium, and rub the ingredients well together; then take the mortar from the water-bath, continuing the trituration, and when nearly cool, add the Iodine.

N. B. The inspissated juices of the above narcotics are preferable to the ordinary extract in preparing this plaster.

Properties and Uses.—This plaster may be used for the same purposes as the belladonna plaster, and is also an excellent application over scrofulous and other tumors, white-swelling, and gôitre; and may likewise be applied over the region of the liver and spleen for chronic affections of these organs, and over the lumbar vertebræ in severe dysmenorrhea.—*J. K.*

EMPLASTRUM CAPSICI COMPOSITUM. *Compound Capsicum Plaster. Common Strengthening Plaster. Sear-Cloth Plaster.*

Preparation.—Take of Rosin *four ounces;* Yellow Wax *one ounce;* Tincture of Capsicum *half a pint.* Melt the Rosin and Wax, and add the Tincture; keep stirring by a gentle heat, until the alcohol is evaporated; then remove from the fire, and when nearly cold, add Pulverized Camphor *half an ounce,* Oil of Sassafras *forty-five minims.* Stir till cold. *Beach's Am. Prac.*

Properties and Uses.—This forms a gently stimulating and strengthening plaster, and may be used in all cases where artificial support, prevention of the contact of atmospheric air, or mild stimulation is required.

EMPLASTRUM EXTRACTI ACONITI RADICIS. *Plaster of Extract of Aconite Root.*

Preparation.—Take of Aconite Root, in coarse powder, *four ounces;* Alcohol, sp. gr. 0.835, *a sufficient quantity;* Adhesive Plaster *three ounces and a half.* Moisten the powdered Aconite Root with *six ounces* of Alcohol, and permit it to macerate twenty-four hours, then put it in a percolator, and when properly packed, pour on gradually sufficient Alcohol to make a pint of tincture. Distill off three-fourths of the Alcohol, evaporate the residue on a water-bath, to a thick, syrupy consistence, then add the plaster, previously liquefied, and stir constantly, until it is properly incorporated with the soft resinous extract, and cools.

History.—This formula is recommended by Wm. Procter, Jr., as superior to that in which only the *Aconitia* enters, being more uniform in its strength and of equal efficacy. It has a brown color, and homogeneous consistence, and weighs about four Troy ounces. It should be spread in a thin layer on skin or oiled silk, and may be used several times when its application has not been too long continued at first.

Properties and Uses.—This extract is anodyne, and may be used as an application to painful and inflamed parts. It has been found decidedly beneficial in neuralgia of the head, and in painful tumors of the breast.

EMPLASTRUM MYRICÆ. *Bayberry Plaster. Green Salve.*

Preparation.—Take of White Gum Turpentine and Bayberry Wax, each *two ounces.* Melt together, strain, and stir till cold. In winter a small quantity of Olive Oil may be added.—*Beach's Am. Prac.*

Properties and Uses.—This forms a very valuable and efficacious application to scrofulous and other ulcers, also to many cutaneous affections. It is often prepared of the consistence of an ointment for these purposes. See *Bayberry Ointment.*

EMPLASTRUM PICIS COMPOSITUM. *Compound Tar Plaster. Irritating Plaster.*

Preparation.—Boil Tar *three pounds,* for half an hour; then add Burgundy Pitch *one pound and a half;* White Gum Turpentine *one pound,* (having previously melted them together, and strained). Stir them together, remove from the fire, and add finely powdered Mandrake root, Blood-root, Poke-root, Indian Turnip, of each *ten ounces.* Incorporate well together.—*T. V. M.*

Properties and Uses.—This plaster is irritant, rubefacient and suppurative. It is used extensively in all cases where counter-irritation or powerful revulsion is indicated, in neuralgia, rheumatism, and in all painful chronic diseases. It acts more efficiently, and is much more adhesive when spread quite thin, on soft leather, than when spread on any kind of cloth; though it may be spread on oil-silk, india-rubber cloth, or other substance that will not absorb any portion of it. This plaster may be held in place by a bandage or two, as it has to be removed daily,—but when it is desired to have a firmer adhesion to the skin, some adhesive plaster may be applied around the margin left on the material upon which the Tar Plaster is spread. When applied to a part of the body, it must be removed daily, for the purpose of thinly re-spreading the same piece of leather, or oil-silk, etc., with the plaster, which is to be immediately reapplied upon the part. This course is to be continued until the surface to which it is applied, commences discharging matter, after which it should be removed two or three times a day, wiping it quite dry each time before re-spreading it, and likewise carefully drying the sore as much as possible. This latter is best accomplished by lightly pressing upon it soft pieces of dry cotton, linen, or lint, so as to absorb all the pus. The practitioner must bear in mind that he is never, no matter what may be the condition of the sore or surrounding parts, to wet it; this will render it irritable and inflamed, cause it to cease suppurating healthily, and even to require its immediate healing.

This plaster is very painful, producing more or less irritability of the system, and should never be used except when this is indispensable; when it becomes very painful and irritating, depriving the patient of sleep, or causing him to complain loudly, it must be removed, and a slippery-elm poultice be applied. Many practitioners consider the disturbance of sleep, alone, as an indication for removing the plaster; which may be reapplied, when it is desirable to continue the suppurative discharge for a longer time, as soon as the elm poultice has allayed the local irritation. If this is not required, the sore may be healed by some simple application, as simple cerate, a mixture of beeswax and tallow, Red Oxide of Lead Plaster, etc. Whenever the Tar Plaster or the dressings to the sore produced by it, are removed for renewal, the sore should each time be cleansed from matter, in the manner referred to above. As the peculiar odor of the ingredients of this plaster may be observed in the excretions, there is no doubt but that they are absorbed into the system, and exert an alterative as well as a counter-irritating influence.

EMPLASTRUM PLUMBI OXIDI RUBRUM. *Red Oxide of Lead Plaster. Black Salve.*

Preparation.—Take of Olive Oil *one quart;* Rosin, Beeswax, of each *one ounce.* Melt together, and raise the mixture nearly to the boiling point; then gradually add Pulverized Red Lead *twelve ounces.* Stir constantly, and when the Lead is taken up by the Oil, the mixture becomes brown, or a shining black; then remove from the fire, and when nearly cold add of Pulverized Camphor *four scruples.* It should not be removed from the fire until its consistency is such that it may be spread easily, and which may be ascertained by removing small portions of it from time to time, on a knife, and testing this when cold.—*Beach's Am. Prac.*

This is undoubtedly the old *Nuremberg Plaster* of the *German pharmacopœias*, the formula for which is as follows: Take of Red Lead *eight ounces;* Olive Oil *a pound*; mix, and expose to a heat until the mixture assumes a brown or blackish appearance, and then add Rosin *half an ounce;* Yellow Wax *an ounce and a half;* Camphor *two drachms;* stir thoroughly together.

In the preparation of this plaster, it must be remembered that the Oil will require a heat of about 600° for ebullition; and should bubbles be observed when the heat is only 212°, it will probably be owing to the presence of water. If the Oil, itself, is not brought to the boiling point, the Red Lead will not be acted upon; hence, the operator should not add it until the Oil has been so far heated as to scorch a feather when dipped into it.

Properties and Uses.—This is a valuable application in burns, many cutaneous affections, and syphilitic, scrofulous, fistulous, and all other species of ulcers.

A preparation similar to the above is employed by many practitioners in preference; it is made as follows: Boil *two quarts* of Linseed Oil until it will a scorch a feather, then gradually add *one pound* of Red Lead in powder; when the Red Lead is taken up by the Oil, and the mixture is black, remove from the fire, and when nearly cold add *two ounces* of Oil of Turpentine, and stir until the mixture is cold.

EMPLASTRUM PLUMBI. *Lead Plaster. Litharge Plaster.*

Preparation.—Take of finely powdered Oxide of Lead (Litharge) *two pounds and a half;* Olive Oil *half a gallon;* Water *one pint.* Mix them; boil, at a heat between 200° and 212° F., and stir constantly till the Oil and Litharge unite, replacing the water if it evaporate too far.—*Ed.*—*Lond.*—*Dub.*

Wittstein prepares this plaster by mixing six and one-third parts of very finely powdered litharge with one and three-fourth parts of water in a copper or earthen vessel, and gently warmed. At the same time ten parts of olive oil are weighed into a copper vessel, capable of containing fifty parts, and the process conducted as related in the following paragraph.

The olive oil should be placed in a vessel capable of containing at least four times its bulk, and heated, at first gently, until it begins to fume and crackle, when, with constant stirring, the litharge and water, which have been gently heated in another vessel, are to be added in very small portions, taking care that one portion is nearly dissolved, or that no more bubbles or aqueous vapors are evolved, before another is added. After the addition of the last portion, heat for a few minutes, withdraw a small portion and knead it under water; if it is readily worked, without imparting a milkiness to the water, the whole is allowed to cool, and molded to the required form. If the test is unsatisfactory, the boiling must be continued, with the occasional addition of an ounce or so of warm water, but a quarter of an hour should be ample time.

History.—Olive oil is composed of about 70 parts of olein, and 30 of margarin. When hot olive oil is mixed with water and litharge, the latter being a stronger base, combines with the margaric and oleic acids in the oil, while the base in the oil, glycerin, is liberated, and combines with one equivalent of water to form a hydrate. The lead compound thus formed is an *Oleo-Margarate of Lead.* 13,203 parts of olive oil require 8,364 parts of litharge, and 338 parts of water, or 10 parts of olive oil, 6⅓ litharge, and ¼ part of water; the latter must, however, be considerably increased, as the new compound forms but slowly, allowing the greater part of the water to evaporate, which has the good effect of preventing the mixture from becoming too hot, and boiling over, or igniting. Without the addition of water, the oleic acid is not separated from the glycerin, and no plaster forms; if a portion of plaster is formed when no water has been added, it is because oil always contains a small quantity, and the remainder must have been derived from the elements of the oil. There being great disadvantages in omitting the water, this process has no practical value. In the method here given, the formation of the plaster is rapid when the oxide of lead is in fine powder; the mixture of the latter with water must be added warm, otherwise, at the moment of contact with the hot oil, a spirting and boiling up of the mass ensues, from the sudden formation of aqueous vapor. Stirring facilitates the combination, by intimately mixing the particles, and prevents any from adhering to the bottom of the vessel. To a practiced workman the tenacity and consistence of the mass indicates when it is entirely formed, and this is more satisfactorily ascertained by kneading a portion of it under water; if the water becomes turbid, free oxide is present, and oil globules will rise to the surface, and this necessitates a continuance of the boiling, with the addition of a little warm water. In order to remove the glycerin, the plaster is usually kneaded for a time under water, which washes it away.—*Witt.* Unless good pure sweet oil be used, a very imperfect plaster will be obtained; and a heat by steam will be found better than by direct exposure of the vessel to fire.

Lead Plaster, or *diachylon*, as it is frequently termed, is a yellowish white body, or white when the oxide is pure, brittle when cold, plastic when warm, insoluble in water or alcohol, and partially soluble in ether, the margarate of lead forming the residue.

Properties and Uses.—Lead Plaster is chiefly used as a basis for other plasters. It is used in surgery on account of its adhesiveness and mildness of local action, rarely causing irritation. It is used to keep the edges of wounds together, and as an application to blistered and chafed surfaces, and occasionally to some ulcers, all of which it serves to protect from atmospheric influence. The sedative character of the lead aiding in its formation, probably, assists its beneficial action.

An ointment is in considerable use as a dressing for burns, scalds, chilblains, and various cutaneous affections accompanied with a burning or smarting sensation. It is prepared as follows: Take of Lead Plaster *one pound and a half;* melt it by a gentle heat, and when melted, add to it, Oil of Turpentine *nine fluidounces;* Linseed Oil *three fluidounces;* Oil of Origanum *one pound;* Tincture of Opium *three fluidounces.* Stir the articles constantly until the mass has sufficiently cooled. This is applied by completely and thickly covering the affected part with the ointment, over which a layer of raw cotton is to be placed, and allowed to remain until the part is well. In the case of deep burns, should the pain return after a few hours, the ointment should be removed, softening it with some warm oil, and a cataplasm of elm bark, or flaxseed, be applied. It is said to afford prompt relief.

EMPLASTRUM RESINÆ. *Resin Plaster. Adhesive Plaster.*

Preparation.—Take of Lead Plaster *three pounds;* very finely powdered Rosin *half a pound.* Melt the Lead Plaster with a gentle heat, add the Resin, and make a plaster.—*Lond.*

This preparation, when spread upon muslin, forms the ordinary *Adhesive Plaster;* as age impairs its adhesiveness, fresh supplies should be obtained frequently. Sometimes powdered Castile soap is added to it, which increases its plasticity without diminishing its adhesiveness, and renders it less brittle in winter. If a small band of Adhesive Plaster be written on its back as though it were paper, then warmed and placed upon a bottle, it forms an excellent label for placing upon vessels to be kept in cellars and damp places. In place of ink, varnish may be used, colored with vermillion. The following forms an excellent Adhesive Plaster: Take of Resin Plaster *three ounces;* Lead Plaster *thirteen drachms and a half;* Soap, sliced, *two drachms and a half.* Melt together and spread on linen.

Properties and Uses.—This plaster is more irritating, as well as more adhesive than the preceding one. It is used in surgery to hold the edges of wounds together, to keep the dressings of ulcers, etc., in place, to make pressure upon, or give support to parts, and for the same purposes as the lead plaster. It is sufficiently irritating in its composition, without having any other stimulating agents combined with it.

EMPLASTRUM RESINÆ COMPOSITUM. *Compound Resin Plaster. Adhesive and Strengthening Plaster.*

Preparation.—Take of White Rosin *twelve ounces*; Yellow Wax, Burgundy Pitch, Tallow, of each, *one ounce.* Melt these together, and add Olive Oil, pulverized Camphor, and Sassafras Oil, of each, *one drachm;* West-India Rum *one fluidounce.* Incorporate well together, then pour the whole into cold water, and work it in the hands till cold, forming it into rolls or sticks.—*Beach's Am. Prac.*

Dr. W. P. Watrous, of Mount Sterling, Ky., prefers the following:—Melt together, Rosin *three pounds;* Beeswax *four ounces;* take from the fire, and when nearly cold add, gradually, Camphor *half an ounce*, dissolved in Oil of Hemlock, Oil of Sassafras, and Olive Oil, of each *one ounce*, Oil of Turpentine *half an ounce.* Work in water as above.

Properties and Uses.—This forms an Adhesive and Strengthening Plaster useful in rheumatism, weakness of the joints, wounds, ulcers, etc. It is possessed of considerable stimulating property, and has been frequently used by practitioners; yet, notwithstanding, it is an unscientific preparation, as the Rum and Tallow will not be found to unite readily. The Emplastrum Capsici Compos, is a much better article to use for the same purposes. The formula of Dr. Watrous will be found a good one, forming an elegant plaster.

ENEMATA.

Injections or Clysters.

Injections are medicinal agents in the form of infusion, decoction, or mixture, etc., designed to be passed into the rectum, vagina, urethra, bladder, etc. Sometimes, pulverized ingredients are added to those intended for the rectum. They are usually thrown into the rectum to remove constipation, to allay inflammation of the lower intestines, to remove ascarides, to stimulate or nourish the system, to produce an influence upon distant organs by sympathetic action, as, to occasion emesis, perspiration, uterine action, etc., and as a revulsive. When medicines or food can not be administered by mouth, from any cause whatever, they may be used in the form of a rectal injection, in about double the quantity required when taken into the stomach; though some care is required in proportioning the dose of powerful medicines for this mode of administration. When an evacuation of the bowels is designed, as in bilious colic, apoplexy, convulsions, constipation, etc., the quantity of fluid should be large—one or two pints for an adult, repeating it every ten, twenty or thirty minutes, until the object is effected. Children will require proportions of the above quantity, according to their ages and susceptibilities. When it is desired to make an impression upon distant or neighboring parts, or upon the rectum itself, or to produce a constitutional influence, the injection should be given in as small an amount of fluid as is consistent with its activity or character, and should be held within the rectum as long as possible; and if the patient can not thus retain it, a warm compress of linen or muslin may be pressed upon the anus with a moderate degree of firmness, by the nurse, and which will prevent the enema from being immediately evacuated.

Injections into the vagina are intended to aid in restoring the normal condition of its walls, to assist in the cure of excoriation or ulceration of the cervix, to remove vaginal leucorrhea, to produce a sedative influence upon the uterus, to induce premature delivery, etc. Uterine injections are designed to remove a low grade of inflammation of its mucous lining membrane, to cure ulceration in the canal of the cervix, to stimulate the organ to activity, etc. Urethral injections are to relieve inflammation of the urethra or bladder, to check chronic discharges from the urethra, heal ulceration of the bladder, stimulate the mucous lining membrane of the urethra, and the prostate gland, etc. And injections into other parts are usually for the purpose either of removing foreign or unhealthy matters, allaying inflammation, or stimulating the parts to increased action. Effects, in this way, are frequently obtained of a very salutary character, and which it would be impossible to procure by the administration of remedies by mouth. There are so many ingenious instruments at present contrived for the administration of injections that it is almost impossible to speak in favor of any particular one; suffice it to say that the old-fashioned clyster-bag and pipe is inferior to any other apparatus for this purpose, and should not be used when any of the others can be obtained.

Injections are a very valuable mode of treatment in many diseases; indeed some affections can not be readily nor permanently cured without them. They are found especially beneficial in bilious colic, in bilious, typhus, yellow, and congestive forms of fever, in dysentery and diarrhea, etc. In infants, life has often been preserved by their timely application, and the pains and dangers of the parturient woman, have frequently been very materially lessened by their use. And yet, notwithstanding their value and importance, there are hundreds of families, especially in country places, who do not supply themselves with the articles necessary for their administration, but who depend entirely upon the physician, or perhaps a neighbor, for the use of a syringe. This is a very reprehensible omission, and although not exactly within the province of this work, yet, from the evil results which I have seen depending upon a negligence of the above character, I can not refrain from making a few brief advisory remarks. Every individual, and more especially every family, is liable to sickness which may require the use of a syringe, and to depend upon the physician for its supply is certainly bad policy, for very few, especially among those practicing in the country, furnish themselves with a quantity sufficient to meet the demands of the various families under their professional care; beside, very few physicians carry an article of this kind, and in some diseases, the delay occasioned by sending for it may be death to the patient. No doubt, an immense number of patients, and more particularly among those residing in the country, die yearly solely from the want of an instrument with which to administer an injection. It is, therefore, a matter of duty with the practitioner, both to himself and to his patients, to strongly impress these facts upon those who patronize him professionally, and urge them by all means to make the necessary provision. A metallic syringe capable of holding a pint, and a smaller one of three or four fluidounces should be found in the possession of every family, as these can be adapted to meet any emergency requiring their use.

Injections are emollient, stimulant, anodyne, purgative, antispasmodic, etc., and are most generally prescribed by the physician to suit the emergency of the case, without regard to officinal directions. For purposes of nutrition as well as to reduce inflammation of the lower intestines, infusions of starch, of elm bark, of flaxseed, and of corn-meal, are usually injected into the rectum, with a portion of laudanum added when inflammation is present; and in cases where the stomach rejects all food and medicine, and when this condition is accompanied with prostration, a proper quantity of wine, brandy, or some similar stimulant may be added to the nutrient clyster, and repeated as often as the circumstances require. The following are among the agents of this class in more common use:

ENEMA ALOES COMPOSITA. *Compound Clyster of Aloes.*

Preparation.—Take of Aloes *two scruples;* Carbonate of Potassa *fifteen grains;* Tincture of Assafetida *three fluidrachms;* Infusion of Boneset *half a pint.* Mix, and rub them together.

Properties and Uses.—This is a stimulant, cathartic, and vermifuge clyster, and may be used with advantage in cases of ascarides in the rectum, and of amenorrhea attended with constipation.—*J. K.*

ENEMA ASSAFŒTIDÆ COMPOSITA. *Compound Clyster of Assafetida.*

Preparation.—Take of Mandrake-root *two drachms;* Balmony *four drachms;* Water *half a pint.* Make a decoction, strain, and add to it Tincture of Assafetida *three fluidrachms.*

Properties and Uses.–This is used with children troubled with ascarides in the rectum. To a child two or three years old, about one half of the quantity may be used at a time, and repeated according to circumstances.—*J. K.*

ENEMA CATHARTICUM. *Cathartic Clyster.*

Preparation.—Take of Common Table-Salt *half an ounce;* Olive or Castor Oil *one fluidounce;* Molasses *two fluidounces;* Warm Water *two pints.* Mix together.

Properties and Uses.—This is a very common laxative clyster, and one the ingredients of which are generally to be procured readily in every family. The above quantity is intended for an adult; it may be given at once, or be divided into two equal parts, to be used within ten or fifte minutes of each other. It is generally employed in cases of constipation, or where a speedy evacuation of the bowels is desired. An injection is sometimes used for the above purposes, and in diarrhea and dysentery, and, indeed, in almost every case where one is indicated, composed as follows: Take of Sweet Milk *half a pint;* Infusion of Elm Bark *half a pint;* Olive Oil *two fluidounces;* Molasses *four fluidounces;* Bicarbonate of Potassa *half an ounce.* Mix these articles together. When there are pains and gripings in the lower intestines, laudanum *half a fluidrachm,* may be added to each injection.—*Beach's Am. Prac.*

ENEMA CIMICIFUGÆ COMPOSITA. *Compound Clyster of Black Cohosh.*

Preparation.—Take of Black-Cohosh Root, in powder, *two ounces;* Cranesbill-root, in powder, *two ounces;* Water *four pints.* Mix them together, make a decoction, and strain.

Properties and Uses.—This is an astringent preparation, combining with it a peculiar influence on the vaginal walls and cervix uteri, and is much employed in leucorrhea, prolapsus uteri, relaxation of the vaginal walls, etc. It should be used with a female syringe, and repeated three or four times a day; the patient being placed in a recumbent position on her back, with the hips elevated, so as to retain the injection some ten or fifteen minutes, each time.—*T. V. M.*

ENEMA LOBELIÆ COMPOSITA. *Compound Clyster of Lobelia. Antispasmodic Clyster.*

Preparation.—Take of Water *half a fluidounce;* Compound Tincture of Lobelia and Capsicum, *half a fluidrachm.* Mix together.

Properties and Uses.—This is a relaxant and antispasmodic clyster, and is used in cases of tetanus, convulsions, rigidity of the os uteri, and whenever its peculiar actions are indicated. The proportions, as given in the above formula, are adapted to an infant from several weeks to a year old, laboring under an attack of convulsions; for adults, half a fluidounce or even more of the tincture, may be added to a sufficient quantity of water; and so in proportion.

ENEMA OPII. *Clyster of Opium.*

Preparation.—Take of Decoction of Starch, or Infusion of Elm Bark, *one fluidounce;* Tincture of Opium *twenty minims.* Mix them.—*Lond.*

Properties and Uses.—This clyster is useful in irritation or inflammation of the bladder, uterus, or prostate gland, in obstinate emesis, in the passage of renal calculi, in nephritis, in dysentery, and in painful affections of the large intestines. It may sometimes be necessary to double or treble the quantity of opium tincture named in the formula. It should be retained in the rectum as long as possible, and may be repeated every one, two, or three hours, and in severe cases even oftener, according to the urgency of the symptoms. If frequently employed it will produce the constitutional effects of the opium.

ENEMA SENNÆ COMPOSITA. *Compound Clyster of Senna.*

Preparation.—Take of Senna and Boneset, of each, *four ounces:* Boiling Water *one quart.* Pour the Water on the herbs and macerate them by a moderate heat for about ten minutes; then strain, and add while yet hot, Molasses *four fluidounces;* Common Salt, and Powdered Lobelia Seed, of each, *two drachms;* Powdered Bayberry Bark *two ounces;* Powdered Capsicum *two drachms.*

Properties and Uses.—This is one of the best clysters that can be used in bilious colic; it should be given as warm as the patient can bear, one-half the above quantity at a time, and may be repeated in fifteen minutes; of course in connection with this, the internal administration of a decoction of Dioscorea Villosa, and local applications of cloths wet with hot water are to be employed.—*J. K.*

ENEMA TEREBINTHINÆ COMPOSITA. *Compound Clyster of Turpentine.*

Preparation.—Take of Castor-oil *half a fluidounce;* Oil of Turpentine *two fluidrachms;* Camphorated Tincture of Opium *one fluidrachm.* Mix together.

Properties and Uses.—This injection is principally employed in flatulency, and tympanitic tension of the abdomen, especially during an attack of peritonitis. It may be repeated two, three, or four times a day. It may likewise be used in ascarides, obstinate constipation, and amenorrhea.

ENEMA XANTHOXYLI.—*Clyster of Prickly Ash.*

Preparation.—Take of Water *one fluidounce;* Tincture of Prickly-Ash Berries *one fluidrachm;* Tincture of Opium *twenty minims;* mix together.

Properties and Uses.—This clyster will be found very beneficial in tympanitic distension of the abdomen from any cause. It will likewise be found efficacious in Asiatic cholera, and in diarrhea; in these last diseases it should be given and repeated immediately after each operation from the bowels, and should be retained in the rectum as long as possible. I have also used it with much benefit in the tympanitic abdomen of children, which so generally proves fatal, and which attends or follows an attack of diarrhea or summer-complaint.—*J. K.*

EXTRACTA.

Extracts.

When an infusion, decoction, or tincture, is reduced to a soft, solid mass, this is termed an *Extract.* If it be prepared from a decoction or infusion it is called a *Watery* or *Aqueous Extract;* if from an alcoholic tincture, it forms an *Alcoholic Extract;* if both water and spirit are used in preparing it, it is termed a *Hydro-alcoholic Extract;* if ether, wine, or acetic acid, be the menstruum from which it is made, it is called *Ethereal, Vinous,* or *Acetous Extract,* according to the fluid used. The most important point in the manufacture of extracts is to employ as a solvent a liquid that will take up the medicinal constituents of a remedy, and but little, if any, of its inactive portions. The constituents of plants not desirable to extract are gum, amylum, saccharine matter, tannic acid, apotheme, etc., and as these are soluble in water, and the first two, especially, are insoluble in alcohol, in most cases alcohol or ether will be found a better medium for obtaining the active principles than water. The best solvent of the medicinal virtues of plants will be that fluid in which they are the most readily dissolved: thus, resins, oils, oleo-resins, etc., require alcohol, and, occasionally, ether; alkaloid principles require acidulated fluids, using such acids as will not form an insoluble preparation with the alkaloid; bitter extractive requires water; and some plants will require two or more solvents, either combined together, or employed successively, mixing together the several residual extracts after they have all been thus obtained. In the preparation for an extract, the operator should previously acquaint himself with the nature of the principles contained in the drug, their solubility, their relations to heat and air, their volatility, etc., so that he may adopt the menstruum best calculated to remove the greatest amount of active matter, and control the evaporation, so that this may not be injured by heat, nor lost by volatilization. Frequently, the juices of fresh plants are obtained by grinding and pressing, and then evaporating to the proper consistence; these have been termed *Inspissated Extracts.* But, unless the active principle of the plant resides in the juice, such extracts are worthless.

There is, probably, no class of remedial agents, requiring so much care in their preparation as extracts; for, if an extract be improperly prepared, either by employing a wrong solvent, or too much heat, etc., it is of no value as a medicine, and is not to be relied upon by the physician. At the present time, it has been found that extracts prepared from decoctions are, with a few exceptions, worthless; hence, the medicated liquids from which they are obtained are procured either by displacement, maceration, digestion, or infusion. These are permitted to evaporate spontaneously, by the application of heat, or in vacuo. The latter furnishes the best extract, the first the next best, while that obtained by the remaining mode is of medium character, and apt to be of variable strength. On this account it is very difficult for druggists or physicians to manufacture the best extracts, not generally being provided with the necessary apparatus for so doing. Establishments, however, are formed in various sections of the country for the preparation of extracts on a large scale, and as good articles can be furnished at prices much cheaper than the druggist could afford to manufacture them for, it is preferable to procure them from such establishments. The extracts of Merrell, Hill, Tilden etc., have been before the profession for a number of years, and have invariably been found active and efficient; the author has employed them in his practice, and prefers them to any others he has used; though, undoubtedly, some other establishments prepare good extracts, but he has not had an opportunity of testing them.

Ordinarily, the plan adopted is, to obtain the juice, or tincture, etc., of the plant, gently heat it to coagulate albuminous substances, filter or strain it, and then evaporate at a temperature ranging between 90° and 200° F., being careful never to raise it to the boiling point. A high temperature, as well as atmospheric action, will impair the efficacy of the preparation. But this mode, although it has been the one pursued for many years, is far inferior to that of preparing this class of medicines in vacuo.

In forming the solution for *aqueous extracts*, soft water, as free from foreign matters as possible, should be employed. Clean rain water, or the water from some of our lakes or rivers, will be found to answer quite as well as water which has been distilled. The articles to be acted upon by the fluid should be ground or crushed, but not too finely, or they may be cut into small pieces. If the powder be too fine the inert matters will be more apt to be extracted and deposited in the liquid. Boiling water should then be poured on, and a gentle heat maintained for twenty or thirty minutes, according to the greater or less degree of solubility of the active principles, the vessel inclosing the articles being covered. Additional water must be used, forming new solutions, until the whole of the active matter is extracted. Filter the solutions, and evaporate in a sand or water-bath, until the proper consistence is obtained. The evaporation should be conducted at as low a temperature, and as quickly as the nature of the solution will admit, using a broad, shallow dish, and *not stirring* it, in order to avoid exposing too great a surface to the injurious action of the atmosphere. Long continued evaporation by heat, under exposure to the atmosphere, is as detrimental to an extract as a boiling heat, hence, the solutions should be procured in as concentrated a form as possible. And in those instances where different solutions are obtained, the weaker ones should be the first evaporated, not adding the stronger until the first have been brought to an equal strength with them; by this means, the more concentrated liquids will not be injured by too long an exposure to heat.

When alcohol or ether is used in the preparation of extracts, it will be best to distill these fluids, not only for the purpose of saving them, but likewise to prevent the extracts from being impaired by atmospheric influence. *Hydro-alcoholic extracts* are best made by first forming an alcoholic extract from the plant, then an aqueous extract, and combining the two while hot. *Ethereal extracts* are usually of a semi-fluid consistence. Mr. W. S. Merrell has invented an instrument, by means of which as the percolated tincture falls into the receiver, the ether is driven off to pass again through the articles, and thus continue until all their strength is exhausted; the whole process of tincturing and forming an extract being thus performed at the same time.—*See Art. on Extracts by Tilden, page* 1011. Extracts should be kept in glass, stone, or earthenware vessels, and be guarded as much as possible from the action of air and light, by covering them with tin foil and leather; and to prevent them from becoming moldy, their surfaces may be covered with a small quantity of Alcohol. Extracts thus fixed, in large jars, may be kept for an indefinite length of time by placing the jars in air-tight vessels from which the air has been removed by an air-pump. Each jar of extract will require an air-tight receiver for itself; from this, smaller pots may be filled from time to time for dispensing purposes, the air being removed from the receiver every time the larger jar is returned to it.

The modes of preparing extracts are as follows:—

1. AQUEOUS EXTRACTS.—Take of the Leaves, Root, Bark or other part of the plant employed, in coarse powder or pieces, *a pound;* Water *a sufficient quantity.* Mix the Leaves, or Roots, etc., with half its weight of clean soft water; in twelve hours put the whole into a displacement apparatus, and exhaust it by adding Water to it from time to time, until the liquid which passes no longer contains any of the virtues of the plant, or part of it, employed. Expose this filtered infusion to a temperature of 212° F., then strain it, and evaporate it in the vapor-bath to the due consistence.

2. ALCOHOLIC EXTRACTS.—Take of the Leaves, Root, Bark, or other part of the plant employed, in coarse powder or pieces, *a pound;* Diluted Alcohol *a sufficient quantity.* Mix the Leaves, or Root, etc., with half their weight of Diluted Alcohol, or enough to thoroughly moisten them; in twenty-four hours put the whole into a displacement apparatus, and exhaust by adding Diluted Alcohol to it from time to time, until *four pints* of tincture have been obtained. Then add clean, soft water, and continue it, until the liquid which percolates through causes a slight turbidness of the previously filtered liquor, as it drops into it. [The object of adding the water toward the latter part of the process is to remove the alcohol absorbed by the powder; and as soon as this is effected, and the water commences to percolate, it causes a turbid condition of the filtered Alcoholic fluid immediately around the drops as they fall into it.] Place the filtered liquor in a retort, and remove the Alcohol by distillation, and then evaporate the residue in the vapor-bath to the due consistence.

3. HYDRO-ALCOHOLIC EXTRACTS.—Take of the Leaves, Root, Bark, or other part of the plant employed, in coarse powder or pieces, *a pound;* Alcohol ninety per cent., Water, of each, *a sufficient quantity.* Mix the Leaves, or Roots, etc., with half their weight of Alcohol, or enough to thoroughly moisten them; in twenty-four hours put the whole into a displacement apparatus, and exhaust by adding Alcohol to it from time to time, until it passes off without any taste of the article employed. Distill off the greater part of the Alcohol from this filtered tincture, and evaporate the remainder to the due consistence.

To the powder in the displacement apparatus, add gradually Water *a sufficient quantity*, until the liquid which passes no longer contains any of the virtues of the plant, or part of it, employed. Expose this filtered infusion to a temperature of 212° F., then strain it, and evaporate it in the vapor-bath to the due consistence.

Mix the Alcoholic and Aqueous Extracts thus obtained, while each are
d stir constantly until cold.

Any variation from the above process, in the preparation of the following extracts, will be explained under its appropriate head.

EXTRACTUM ACONITI ALCOHOLICUM. *Alcoholic Extract of Aconite.*

Preparation.—Exhaust coarsely powdered Aconite Leaves, or Aconite Roots, in a percolator, with Diluted Alcohol *a sufficient quantity.* From the tincture thus made distill off the Alcohol, and then evaporate the residue until it is of the required consistence. Be careful not to spoil the extract by too high a temperature while evaporating. See preparation of *Alcoholic Extracts* on page 1067.

This is the only extract of aconite, that should be used. It should be carefully prepared, in a water-bath, employing a moderate heat, lest it be spoiled. The water is added toward the latter end of the process in order to drive out the alcohol retained by the plant, and as soon as the water passes, it renders the filtrate turbid, when the operation should be finished.

Properties and Uses.—Extract of Aconite possesses the properties of the plant in a powerful degree; it may be used in rheumatism, neuralgia, gout, scrofula, cutaneous diseases, inflammatory and febrile diseases, and in all cases in which the use of aconite is admissible. The dose is from one-fourth of a grain to a grain, two or three times a day, which may be increased to two grains if required. When the extract is of good quality it causes numbness and tingling in the mouth and lips, shortly after taking it. The extract prepared from the root, as above, is much more active, and should be administered in smaller doses.

EXTRACTUM ALETRIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Unicorn Root. Aletridin.*

Preparation.—Exhaust coarsely powdered Unicorn Root *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts* on page 1067.

Properties and Uses.—This forms a very elegant and useful preparation of Unicorn Root. It may be used as a tonic in cases of debility of the digestive organs, and will be found valuable in uterine difficulties, as prolapsus, amenorrhea, dysmenorrhea, etc. The dose is from half a grain to two grains, three times a day.—*W. S. M.*

ALCOHOLIC EXTRACTUM ANTHEMIDIS. *Alcoholic Extract of Chamomile.*

Preparation.—Exhaust Chamomile flowers, bruised, *a pound*, with Diluted Alcohol *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Alcoholic Extracts*, on page 1067.

Properties and Uses.—Extract of Chamomile is a tonic, and may be used in all cases where the crude article is indicated. It may be beneficially combined with other extracts, as of scullcap, cramp-bark, black-cohosh, golden-seal, ladies'-slipper, etc. The dose is from one to five grains, three times a day.

EXTRACTUM APOCYNI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Indian Hemp.*

Preparation.—Exhaust coarsely powdered Indian Hemp (*Apocynum Cannabinum*), *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is purgative, and, either alone or in combination with leptandrin, is much employed in affections of the liver and stomach, in intermittents and in the low stage of typhoid fevers. It has also been employed with advantage as a diuretic and emmenagogue. The dose is from one to ten grains, two or three times a day.—*W. S. M.*

EXTRACTUM ARCTII. *Extract of Burdock.*

Preparation.—Exhaust Burdock Root, coarsely powdered, or in pieces, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—Extract of Burdock is used principally as an alterative, in scrofula, syphilis, cutaneous affections, etc. The dose is from five to twenty grains, repeated three times a day.

EXTRACTUM ASCLEPIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Pleurisy Root.*

Preparation.—Exhaust coarsely powdered Pleurisy Root *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—Hydro-alcoholic Extract of Pleurisy Root is expectorant, tonic, laxative, and antispasmodic. It will be found useful in chronic and acute catarrhal coughs, rheumatic affections, dysentery, etc. From its peculiar action upon the ligaments of the uterus, it proves highly beneficial in prolapsus, and other displacements of this organ. The dose is from three to ten or fifteen grains three times a day.—*W. S. M.*

EXTRACTUM BAPTISIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Wild Indigo.*

Preparation.—Exhaust coarsely powdered Bark of Wild-Indigo Root *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is antiseptic, with purgative and emetic properties when taken in large doses. It is especially advantageous in typhoid conditions of the system, in malignant ulcerations of the mouth and throat, in scarlatina, and in all cases where there is a tendency to putrescency or gangrene. It exerts a powerful stimulant effect on the glandular and nervous systems, and will be found useful in scrofula, obstinate hepatic torpor, etc. Its virtues are increased by combination with leptandrin, podophyllin, or cimicifugin. The dose is one-fourth of a grain gradually increased to one or two grains, and repeated three times a day.—*J. K.*

EXTRACTUM BELLADONNÆ ALCOHOLICUM. *Alcoholic Extract of Belladonna.*

Preparation.—Exhaust coarsely powdered Belladonna Leaves in a percolator, with Diluted Alcohol *a sufficient quantity.* From the tincture thus made distill off the Alcohol, and then evaporate the residue until it is of the required consistence. Be careful not to spoil the extract by too high a temperature while evaporating. (*See Preparation of Alcoholic Extracts, on page* 1067.)

Properties and Uses.—This extract possesses all the virtues of Belladonna, *which see*, and is the most usual form of administration. The dose is from one-eighth of a grain to half a grain, or even a grain, to be repeated two or three times a day.

EXTRACTUM CAULOPHYLLI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Blue Cohosh.*

Preparation.—Exhaust coarsely powdered Blue-Cohosh Root *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—Hydro-alcoholic Extract of Blue Cohosh is antispasmodic and parturient. It may be advantageously combined with dioscorein in bilious colic, flatulency, and griping pains arising from the use of drastic purgatives; with xanthoxylin, hydro-alcoholic extracts of cimicifuga, or scutellaria, in rheumatic affections; and with senecin, cimicifugin, aletridin, asclepidin, or extract of cramp-bark in uterine diseases. It will be found very useful in amenorrhea and dysmenorrhea; and forms with hydrastin an elegant remedy for deranged conditions of the stomach, dyspepsia, etc. It has also been found serviceable in after-pains. The dose is from one to five grains, three times a day.—*J. K.*

EXTRACTUM CIMICIFUGÆ ALCOHOLICUM. *Alcoholic Extract of Black Cohosh.*

Preparation.—Exhaust Black-Cohosh Root, in moderately fine powder, *a pound*, with Diluted Alcohol *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Alcoholic Extracts*, on page 1067.

Prof. W. Procter, jr., recommends to exhaust the root in the same manner as when preparing the fluid extract (which see), and evaporate the solutions separately until they have a syrupy consistence, mix them, and finish the evaporation with care over a water-bath with constant stirring. Eight grains represent a drachm of the root. (The hydro-alcoholic extract of cimicifuga formerly directed, is less active and efficient than the alcoholic alone.)

Properties and Uses.—Alcoholic Extract of Black Cohosh possesses all the virtues of the root, and in nervous derangements, as chorea, epilepsy, etc., is much superior to the cimicifugin in action and efficacy; it is decidedly more narcotic and antispasmodic than this resinoid. I make extensive and successful use of it in epilepsy, chorea, delirium-tremens (in which I combine it with quinia), nervous excitability, and many spasmodic affections. Persons subject to cramps will be speedily and permanently relieved by the employment of this extract combined with the extract of cramp-bark. The Alcoholic Extract of Black Cohosh may be used in all instances where the employment of the root is indicated. The dose is from one to five or ten grains, three times a day.—*J. K.*

EXTRACTUM COLOCYNTHIDIS. *Extract of Colocynth.*

Preparation.—Take of Colocynth, sliced and deprived of its seeds, *three pounds;* Diluted Alcohol *half a gallon.* Macerate the Colocynth in the Diluted Alcohol for thirty-six hours, occasionally pressing it with the hand. Express the liquor strongly and strain. Finally, evaporate to the proper consistence.—*Lond.*

Properties and Uses.—This extract is cathartic, and may be used in the dose of from five to thirty grains.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Compound Extract of Colocynth.*

Preparation.—Take of Extract of Colocynth *one drachm;* powdered Extract of Aloes *six drachms;* powdered Scammony *two drachms;* powdered Cardamoms *half a drachm;* Castile Soap (soft), *one drachm and a half.* Mix the powders, and the remaining ingredients being added, beat all together so that a pill-mass may be formed.—*Lond.* Dr. E. R. Squibb, M. D., of the U. S. Navy, from the inefficiency of this compound as generally prepared, recommends the following formula: Take of dry Extract of Colocynth *ten drachms and a half;* Aloes *thirty-four drachms and a half;* Scammony *eleven drachms and a half;* Cardamom *three drachms;* Soap, dried at 212°, *seven drachms and a half.* Mix thoroughly together, pulverize, and sift, and make into pills with Water *a sufficient quantity.* —*Am. Jour. Pharm. XXIX.* 97.

Properties and Uses.—Compound Extract of Colocynth is an active cathartic, and may be employed in all cases where catharsis is indicated. From the difficulty with which pure scammony can be obtained in this country, I would suggest as a substitute for it, in the above formula, podophyllin, in powder, *one drachm,* and which will by no means lessen the value or efficacy of the preparation. This extract may be especially used in constipation, torpor of the liver, headache, etc., in doses varying from three to twenty grains.

EXTRACTUM CONII ALCOHOLICUM. *Alcoholic Extract of Poison Hemlock.*

Preparation.—Exhaust coarsely powdered Conium Mac. leaves, in a percolator, with Diluted Alcohol *a sufficient quantity.* From the tincture thus made distill off the Alcohol, and then evaporate the residue until it is of the required consistence. Be careful not to spoil the extract by too high a temperature while evaporating. See Preparation of *Alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is narcotic, and may be used in all cases where its peculiar influence is desired. The dose is from one-eighth of a grain, to one, two, or three grains, two or three times a day.

EXTRACTUM CORNUS FLORIDÆ. *Extract of Dogwood.*

Preparation.—Exhaust coarsely powdered Dogwood Bark *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—Extract of Dogwood is tonic and antiperiodic, and may be used as a substitute for quinia, in all cases. It will be found useful in dyspepsia, debility of the stomach, and as a tonic in dropsical affections after the water has been evacuated. The dose is from one to five grains, three times a day.

EXTRACTUM CORYDALIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Turkey Corn.*

Preparation.—Exhaust coarsely powdered Root of Turkey Corn *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-Alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is tonic and alterative, and may be employed in all cases where tonics are indicated. It is useful in all scrofulous affections; and in syphilitic diseases, both primary and secondary, it will be found among our most efficient agents. The dose is from one to five grains, three times a day.—*J. K.*

EXTRACTUM CYPRIPEDII HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Yellow Ladies'-slipper.*

Preparation.—Exhaust coarsely powdered Yellow Ladies'-slipper Root, *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of Hydro-Alcoholic Extracts on page 1067.

Properties and Uses.—This extract is tonic and antispasmodic, and may be used to fulfill all the indications of the crude root in hysteria, chorea, nervous headache, and nervous irritability. It may be combined with the hydro-alcoholic extract of scullcap, in many cases advantageously. Its dose is from one to five grains, two or three times a day.—*W. S. M.*

EXTRACTUM DULCAMARÆ. *Extract of Bittersweet.*

Preparation.—Exhaust the Bark of the Root and Twigs of Bittersweet, coarsely powdered or in pieces, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—The Extract of Bittersweet possesses the active properties of the plant, and may be beneficially employed in scrofula, syphilis, cutaneous diseases, and wherever the plant is indicated. The dose is from two to ten grains, three times a day.

EXTRACTUM EUPATORII. *Extract of Boneset.*

Preparation.—Exhaust the Tops and Leaves of Boneset, bruised, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—Extract of Boneset is tonic and aperient, and may be given with advantage in convalescence from exhausting diseases, intermittent fever, dyspepsia, debility of the digestive organs, and general debility. The dose is from one to ten grains, two or three times a day.

EXTRACTUM GENTIANÆ. *Extract of Gentian.*

Preparation.—Exhaust coarsely powdered Gentian *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—This extract is a tonic, and may be used wherever this indication is present, either alone or in conjunction with other tonics. The dose is from one to ten grains.

EXTRACTUM GOSSYPII. *Extract of Cotton Bark.*

Preparation.—Exhaust the recent Inner Bark of the Root of the Cotton plant, in small pieces, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts* on page 1067. This extract should be placed in small jars, and kept well covered, to prevent as much as possible any loss of its virtues.

Properties and Uses.—Extract of Cotton Bark is emmenagogue and abortivant. It will be found useful in amenorrhea and dysmenorrhea, combined with belladonna and quinia. The dose is from one to five or ten grains, three times a day.—*J. K.*

EXTRACTUM HÆMATOXYLI. *Extract of Logwood.*

Preparation.—Take of Logwood, in fine chips, *a pound;* Boiling Water *a gallon.* Macerate for twenty-four hours, then boil down to four pints, strain, and concentrate in the vapor-bath to the due consistence.—*Ed.*

Extract of Logwood should be a dry, fragile, pulverulent mass. Brande states that twenty pounds of the extract may be obtained from a hundred weight of the rasped wood. Old extract becomes very hard, freqently passing through the bowels undissolved, when given in pills, and should, therefore, not be used in their preparation, but only in solutions.

Properties and Uses.—Extract of Logwood is astringent and tonic, and will be found useful in diarrhea, dysentery, relaxed conditions of the bowels succeeding cholera infantum, and in chronic laryngitis or bronchitis accompanied with considerable mucous expectoration. The dose is from five to thirty grains, two or three times a day.

EXTRACTUM HELENII HYDRO-ALCOHOLICUM.—*Hydro-alcoholic Extract of Elecampane.*

Preparation.—Exhaust coarsely powdered Elecampane Root *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is stimulant and tonic, and is very useful in chronic pulmonary affections, debility of the digestive organs, torpor of the liver, dyspepsia, and chronic cough. The dose is from one to ten grains, three times a day.—*W. S. M.*

EXTRACTUM HYDRASTIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Golden Seal.*

Preparation.—Exhaust coarsely powdered Root of Golden Seal *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract possesses all the tonic virtues of the root, and may be used in all cases where that is indicated. In many instances it will be preferable to hydrastin, on account of the insolubility of the latter. The dose is from two to five grains, three times a day.—*J. K.*

EXTRACTUM HYOSCYAMI ALCOHOLICUM. *Alcoholic Extract of Henbane.*

Preparation.—Exhaust recently dried Henbane Leaves, in coarse powder, *a pound*, in a percolator, with Diluted Alcohol *a sufficient quantity*. From the tincture thus made distill off the Alcohol, and then evaporate the residue until it is of the required consistence. Be careful not to spoil the extract by too high a temperature while evaporating. See preparation of *Alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract contains all the medicinal virtues of the Henbane, and may be administered whenever this drug is indicated. The dose is from one-fourth of a grain to two or three grains, three times a day. The smallest dose must first be given, and the quantity gradually increased until the desired influence is experienced.

EXTRACTUM IGNATIÆ AMARÆ ALCOHOLICUM. *Alcoholic Extract of St. Ignatius' Bean.*

Preparation.—Take of St. Ignatius' Beans *a pound*, bruise them in an iron or brass mortar until reduced to small fragments or very coarse powder; moisten them with Water in a covered vessel, and apply heat until the tissue of the pieces becomes soft, and can be bruised into a pulpy mass. Mix this mass with Alcohol, 0.835, twice its bulk, and macerate in a close vessel and in a warm place for twenty-four hours; then place in a percolator, and add Alcohol until ten or twelve pints of tincture have been obtained. Distill off the Alcohol, heat the residue in a water-bath until reduced to the consistence of a soft extract. About ten per cent. of a brown extract will be thus obtained, of a peculiar heavy odor, and an intensely bitter taste.

Properties and Uses.—Analogous to those of nux vomica, but supposed to be more efficient in nervous diseases, headaches, etc. The dose is about half a grain two or three times a day. It is an active and dangerous preparation, and must be used with care.—*W. Procter, Jr.*

EXTRACTUM IRIDIS ALCOHOLICUM. *Alcoholic Extract of Blue Flag.*

Preparation.—Exhaust coarsely powdered Blue-Flag Root *a pound*, with Diluted Alcohol *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Alcoholic Extracts*, on page 1067.

Properties and Uses.—The Hydro-alcoholic Extract of Blue Flag is a valuable cathartic and alterative. In doses of from one to five grains or more, it will be found a useful purgative in cases of obstinate constipation, hepatic torpor, indigestion, amenorrhea, etc. In larger doses it will produce hydragogue results, and may be given with advantage in chronic pulmonary affections, dropsy, worms, etc. In doses to fall short of catharsis, it becomes a valuable alterative, and will be found especially useful in rheumatic diseases, scrofula, syphilis, etc., and will frequently cause ptyalism. A few grains of ginger or capsicum will prevent any harshness of action. As an alterative, the dose is from one-fourth of a grain to one grain, three times a day.—*J. K.*

EXTRACTUM *sive* RESINA JALAPÆ. *Extract or Resin of Jalap.*

Preparation.—Take of Jalap, in moderately fine powder, *two pounds;* mix it thoroughly with a sufficient quantity of Rectified Spirit to moisten it well, let it stand twenty-four hours, and then transfer it to a percolator, and gradually add Rectified Spirits until it passes off without any of the taste of the Jalap. Distill off the greater part of the Alcohol from this filtered tincture, and evaporate the residue over a vapor-bath, to the proper consistence.—*Ed.*

This resin is of a dark-brown color, and of ready pulverization. It is not pure, but is applicable for all practical purposes; when pure it is light-colored, and much more active. G. A. Kaiser states that concentrated sulphuric acid dissolves Resin of Jalap, precipitating on standing a soft glutinous substance of a brown color, in which respect it differs from all other known resins.—*Chem. Gaz.*, 1845. If Jalap Resin be made into a tincture, solution of chloride of lime, or of soda, will communicate a green color if guaiac resin be present as an adulteration.

Properties and Uses.—Jalap owes its cathartic power to its resin, and its diuretic to its mucilage or gum. The resin prepared as above is an active cathartic in the doses of from four to ten grains, with much pain and griping, but which may be obviated by trituration with Castile soap, caulophyllin, or loaf sugar.

EXTRACTUM JUGLANDIS ALCOHOLICUM. *Alcoholic Extract of Butternut.*

Preparation.—Exhaust the Inner Bark of the Recent Root of Juglans Cinerea, in coarse powder or pieces, *a pound*, with Diluted Alcohol *a sufficient quantity;* proceeding in the same manner as explained for the preparation of *Alcoholic Extracts*, on page 1067.

This is of dark color, a caramel-like odor, and a bitterish, somewhat astringent taste. The extract prepared by the country people is of an inferior kind, and should never be purchased by the apothecary. It is usually made with water, which does not extract all the medicinal virtues of the bark, and is likewise apt to be more or less injured by the improper application of heat. Hence, many practitioners, having used the country-prepared extract, and found it irregular in its effects, decry all other extracts. In preparing the extract, the bark of the root should be collected between April and July, and used while fresh.

Properties and Uses.—A gentle cathartic, acting upon the bowels without disposing them to subsequent constipation. The dose is from ten to thirty grains.

EXTRACTUM KRAMERIÆ. *Extract of Rhatany.*

Preparation.—Exhaust the Bark of Rhatany-root, coarsely powdered, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067. The evaporation must be carried so far that the extract will be dry when cold, and should be carried on quickly.

Good Extract of Rhatany is of a dark-red color, somewhat glossy, faintly odorous, powerfully astringent, and almost wholly dissolved by water. Its evaporation should be performed quickly, or else in vacuo, as the atmosphere speedily oxidizes its active principles, impairing them, and rendering them more or less insoluble. The bark of the root furnishes the greatest amount of extract, and that prepared with water is superior to that made with alcohol. For some purposes a soft extract is prepared by stopping the evaporation at the proper time. Much of the Extract of Rhatany found in the shops is of an inferior quality.

Properties and Uses.—Extract of Rhatany may be used whenever an astringent is required; in some cases it will be found preferable to any other agent of this class. The soft extract may be advantageously used as a local application to ulcers, hemorrhoids, and fissures of the anus. The dose is from five to twenty grains, three or four times a day.

EXTRACTUM LEONURI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Motherwort.*

Preparation.—Exhaust the recently dried herb of Leonurus Cardiaca, in coarse powder, *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-Alcoholic Extracts*, on page 1067.

Properties and Uses.—Extract of Motherwort is emmenagogue, nervine, and antispasmodic, and may be used with advantage in all forms of disease in which the cold infusion of the herb is recommended. The dose is from three to six grains, every two or four hours. It may be advantageously combined with asclepidin, or the hydro-alcoholic extracts of black cohosh, nerve-root, cramp-bark, scallcap, etc.—*W. S. M.*

EXTRACTUM LEPTANDRÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Blackroot.*

Preparation.—Exhaust the recently dried root of Leptandra Virginica, in coarse powder, *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract possesses all the medicinal properties of the Blackroot, and may be used wherever that is indicated. The dose is from one to ten grains. It may be beneficially combined with the hydro-alcoholic extract of wild indigo, in typhoid diseases, and where an action upon the liver is desired without active catharsis.

EXTRACTUM LUPULINÆ. *Extract of Lupulin.*

Preparation.—Take of Commercial Lupulin *four ounces;* Alcohol *eight fluidounces.* Place the Lupulin loosely in a percolator, cover with Alcohol, and allow it to stand an hour. Then gradually add Alcohol until two pints of filtered liquor are obtained. Pour this liquor in a shallow dish, and set aside to evaporate spontaneously.— *W. W. D. Livermore.*

Commercial Lupulin is more or less mixed with hops, and consequently varies in its activity. The above extract contains the medicinal principles of the hops unimpaired, is of uniform strength, and is in a form convenient for pills. In making larger quantities of extract, it would be economical to distill off about three-fourths of the alcohol, previous to spontaneous evaporation. Commercial lupulin yields about two scruples of extract to a drachm of the grains.

Properties and Uses.—This extract possesses the active properties of the hops in an eminent degree, and may be used in all cases where lupulin is admissible. The dose is from two to ten grains three times a day.

EXTRACTUM MITCHELLÆ. *Extract of Partridge-berry.*

Preparation.—Exhaust the recently dried herb, Mitchella Repens, in coarse powder, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—This extract is an invaluable preparation, and possesses the active medicinal virtues of the plant. It is employed more especially on account of its tonic influence upon the uterus; and in diseases of this organ it may be usefully combined with cimicifugin, caulophyllin, aletridin, senecin, etc. The dose is from one to ten grains three times a day.—*J. K.*

EXTRACTUM NUCIS VOMICÆ ALCOHOLICUM. *Alcoholic Extract of Nux Vomica.*

Preparation.—"Take of Nux Vomica *any convenient quantity;* expose it in a proper vessel to steam till it is properly softened; slice it, dry it thoroughly, and immediately grind it in a coffee-mill. Exhaust the powder either by percolating it with Alcohol, or by boiling it with repeated portions of Alcohol until this spirit comes off free from bitterness. Distill off the greater part of the spirit; and evaporate what remains to a proper consistence in the vapor-bath."—*Ed.*

Properties and Uses.—This extract contains the powerful properties of Nux Vomica, but varies in strength, on account of the want of uniform quantity of strychnia in the seeds. It may be employed in cases where the action of this agent is required. It is very useful in cases of obstinate constipation, and may be employed in the following combination:—Take Extract of Butternut *two grains;* Podophyllin *one-sixteenth of a grain;* and Alcoholic Extract of Nux Vomica *one-fourth of a grain;* mix thoroughly together and form a pill, which is a dose, and may be repeated two or three times daily, or until the desired effect is produced. The dose of the above Extract of Nux Vomica is from one-fourth of a grain to two grains, repeated two or three times a day.

EXTRACTUM PHYTOLACCÆ ALCOHOLICUM. *Alcoholic Extract of Poke.*

Preparation.—Exhaust the recently dried Leaves of Poke, in coarse powder, *a pound*, with Diluted Alcohol *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Alcoholic Extracts* on page 1067.

Extract of Poke prepared in this manner, is superior to that prepared in the ordinary way with water. The leaves employed in the preparation of the extract should be gathered immediately previous to the ripening of the berries, at which period they are the most active. An extract may be prepared from the Poke-root in the same manner, but it is somewhat doubtful whether it is as energetic as that from the leaves. An extract formed by evaporating the expressed juice of the recent ripe berries is frequently employed, but it is presumed to be inferior in point of efficacy to that from the leaves.

Properties and Uses.—These various extracts of Poke are emetic and purgative in large doses; in medicinal doses they are alterative and are especially useful in syphilitic, mercurio-syphilitic, and rheumatic diseases, and particularly in the osteocopic pains of mercurio-syphilis. They lose their virtues by age, and should be freshly prepared every year. The dose is from one to five grains, or more, three times a day.

The inspissated juice of Poke-berries (*Succus Inspissatus Phytolaccæ Baccæ*), is frequently employed as a valuable agent in rheumatism; it is milder than the extract prepared from the root or leaves.

EXTRACTUM PLANTAGINIS CORDATÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Water Plantain.*

Preparation.—Exhaust the recently dried Root of Water Plantain, in coarse powder, *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—Hydro-alcoholic Extract of Water Plantain is astringent, and has been used with much success in Asiatic cholera, diarrhea, and dysentery. The dose is from one to ten grains, repeated every one, two, or three hours, as the urgency of the case requires.—*W. S. M.*

EXTRACTUM POLYGONI. *Extract of Water-pepper.*

Preparation.—Exhaust the recently dried herb of Water-pepper, in coarse powder, *a pound*, with Water *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Aqueous Extracts*, on page 1067.

Properties and Uses.—Extract of Water-pepper is stimulant, diuretic, and emmenagogue, and is especially useful in amenorrhea, and chronic affections of the kidneys. The dose is from two to ten grains, three or four times a day.

EXTRACTUM PRUNI VIRGINIANÆ ALCOHOLICUM. *Alcoholic Extract of Wild Cherry.*

Preparation.—Take of Wild-Cherry Bark, in coarse powder, *a pound*, Alcohol *a sufficient quantity*. Moisten the Bark with *a pint* of Alcohol, let it stand twenty-four hours, then transfer it to a displacement apparatus, and gradually add Alcohol until it passes off without the taste of the root. Evaporate by a gentle heat, or spontaneously; too great a degree of heat will spoil the extract.

Wild-Cherry Bark yields to alcohol 22 per cent. of dry, deep-red, bitter, astringent extract, containing amygdaline.

Properties and Uses.—It has been suggested that this extract may be rendered available for extemporaneous prescriptions in the following manner, so as to get the sedative power of the Bark associated with all its tonic qualities, thus: Take of Alcoholic Extract of Wild-Cherry Bark two drachms, Emulsion of Sweet Almonds half a pint; triturate the extract with a portion of the emulsion till dissolved, and then add the remainder and mix. It should not be used for several hours after it is prepared. The dose is a tablespoonful, and it may be sweetened with sugar or syrup. Before administration it must be shaken, as the coagulum formed by the tannin of the extract acting on the albumen of the emulsion is not to be removed.—*W. Procter, jr.*

EXTRACTUM PTELEÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Shrubby Trefoil.*

Preparation.—Exhaust the recently dried Bark of the Root of Ptelea Trifoliata, in coarse powder, *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is an elegant preparation, and may be used in all cases where the Ptelea is indicated. Its use is at the present time superseded by that of the Ptelein. The dose is from two to ten grains.—*W. S. M.*

EXTRACTUM RHEI. *Extract of Rhubarb.*

Preparation.—Exhaust coarsely powdered Rhubarb *a pound*, with Diluted Alcohol *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Alcoholic Extracts*, on page 1067. It is common to mix *a pound* of coarse sand with the Rhubarb in the displacement apparatus, to favor the percolation.

Great care is required in the preparation of this extract, as both the tonic and purgative properties of Rhubarb are very apt to become deteriorated by the process. Only a gentle heat must be employed. The extract prepared by evaporation in vacuo, will be found decidedly the best; it possesses the odor and taste of the root.

Properties and Uses.—Extract of Rhubarb possesses virtues similar to the drug itself, and may be given in pill form, or in solution in doses of from five grains to half a drachm.

EXTRACTUM RUMECIS HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Yellow Dock.*

Preparation.—Exhaust coarsely powdered Yellow-Dock Root *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This extract is tonic and alterative, and is efficacious in scrofula, and cutaneous diseases. It is most generally given in combination with some other alterative, as extract of poke, cimicifuga, dulcamara, corydallis, etc. The dose is from one to five grains, three times a day.—*W. S. M.*

EXTRACTUM SANGUINARIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Bloodroot.*

Preparation.—Exhaust coarsely powdered Bloodroot *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—This preparation of Bloodroot is expectorant, alterative, and emmenagogue, and may be used with benefit in pulmonary and hepatic diseases, jaundice, and amenorrhea. Externally, it forms a mild caustic, and may be advantageously applied to indolent ulcers and fistula-in-ano. It possesses the virtues of the root. The dose is from one-eighth of a grain to a grain.—*J. K.*

EXTRACTUM SCUTELLARIÆ HYDRO-ALCOHOLICUM. *Hydro-Alcoholic Extract of Scullcap.*

Preparation.—Exhaust the recent dried herb, Scullcap, in powder, *a pound*, with Diluted Alcohol *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Alcoholic Extracts*, on page 1067.

Properties and Uses.—The Hydro-alcoholic Extract of Scullcap is tonic, nervine, and antispasmodic. It has been used with advantage in cases of nervous excitability, chorea, wakefulness, and restlessness; it may be used alone or in combination with the hydro-alcoholic extracts of cimicifuga, cypripedium, or asclepias. The dose is from one to five grains, three or four times a day.—*W. S. M.*

EXTRACTUM STILLINGIÆ HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of Queen's Root.*

Preparation.—Exhaust the recent Root of Stillingia, cut into small pieces, *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—In large doses the Hydro-alcoholic Extract of Stillingia is emetic and cathartic, for which actions it is but little employed in medicine, on account of the nausea, prostration, and burning sensation at the stomach caused by it. In small doses it is a valuable alterative, peculiar to American practice, and may be efficaciously used in all diseases requiring alterative remedies. It is usually given in combination with other alteratives, the virtues of which it appears to increase. The Compound Syrup of Stillingia is now more generally used in practice, but this extract will be found useful in cases where pills are preferred to fluid preparations. The dose is one, two, or three grains, three times a day.—*W. S. M.*

EXTRACTUM STRAMONII ALCOHOLICUM. *Alcoholic Extract of Stramonium.*

Preparation.—Exhaust recently dried Stramonium Leaves, in coarse powder, *a pound*, in a percolator, with Diluted Alcohol *a sufficient quantity.* From the tincture thus made distill off the Alcohol, and then evaporate the residue until it is of the required consistence. Be careful not to spoil the extract by too high a temperature while evaporating. See preparation of *Alcoholic Extracts*, on page 1067.

An alcoholic extract may be also made by substituting the Stramonium Seed, ground into powder, for the Leaves. The seeds are supposed to furnish a more energetic preparation.

Properties and Uses.—The Alcoholic Extract of Stramonium is preferable either to an aqueous extract of the leaves, or their inspissated juice. It is, in large doses, a narcotic poison; in medicinal doses it is anodyne and antispasmodic, and may be administered with benefit in painful and periodic diseases, nervous excitability or irritability, gastritis, enteritis, peritonitis, dysmenorrhea, rigidity of the os uteri, etc., etc. It may also be applied externally in rheumatic and neuralgic pains, and to reduce local inflammations. The dose is from an eighth of a grain to a grain, three times a day.

EXTRACTUM TARAXACI. *Extract of Dandelion.*

Preparation.—Cut Dandelion-root *any convenient quantity*, into small slices, place them to macerate in barley sufficient water to cover them; in twelve hours, or as soon as they become pulpy, place them under a strong pressure, strain the liquor which passes out, and evaporate until it is of the due consistence, constantly agitating it.

Dandelion-root, for the above purpose, should be collected in September, October, or November. The juice procured by the above method should be evaporated in shallow vessels, by means of steam heat; but the best extract is obtained by evaporation in vacuo.

History.—In the evaporation of this extract, too much heat or too long an exposure to the action of the air, will spoil it. When the extract is good, it is brownish not blackish, bitter and aromatic, and not sweet. A blackish-sweet extract is more or less impaired. The extract should be renewed annually, as it loses its virtues by age and exposure.

Properties and Uses.—Extract of Dandelion is tonic, diuretic, and aperient. It is much recommended in affections of the liver, spleen, and kidneys, in dropsical diseases, etc. I have made much use of various preparations of Dandelion, and the effects are far from being so decided and beneficial as the testimony of writers led me to suppose; we have several agents vastly superior to it in medicinal efficacy, in the diseases for which it is prescribed. The dose of the extract is from ten to sixty grains three times a day.

EXTRACTUM VIBURNI HYDRO-ALCOHOLICUM. *Hydro-alcoholic Extract of High-Cranberry Bark. Hydro-alcoholic Extract of Cramp-Bark.*

Preparation.—Exhaust coarsely-powdered Bark of Viburnum Opulus *a pound*, with Alcohol, Water, of each, *a sufficient quantity*, proceeding in the same manner as explained for the preparation of *Hydro-alcoholic Extracts*, on page 1067.

Properties and Uses.—Hydro-alcoholic Extract of High-Cranberry Bark is tonic and antispasmodic, and may be used in all cases in which the High-Cranberry Bark is indicated. In uterine difficulties it may be advantageously combined with some uterine tonic, as cimicifugin, aletridin, senecin, caulophyllin, etc. In bilious and flatulent colic, and spasmodic pains of the stomach and bowels, it will be found very efficacious in combination with dioscorein. The dose of it is from one to ten grains, three times a day.—*J. K.*

EXTRACTA FLUIDA.

Fluid Extracts.*

These are concentrated medicinal principles, not reduced to a solid or nearly semifluid consistence, as with extracts, and have the advantage over

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*ESSENTIAL TINCTURES.—Mr. Wm. S. Merrell, who is already well known to the profession through his improvements in Pharmacy and the general excellence of his medicinal preparations, has lately proposed a new Hypothesis which has an important bearing on the whole science of Materia Medica.

He holds that it is a law of Organic Chemistry extending with few if any exceptions to all those proximate principles which are the direct products of vegetable and animal life; that pure Alcohol, in its solvent power, discriminates between those elements which are *medicinal* or *poisonous*, and those which are either *nutritive* or *inert.* That all those vegetable and animal organic substances which are not nutritive, but ordinary extracts in being prepared with less evaporation, and consequently less heat, whereby their activity is not so liable to impairment. With some medicines, as for instance, *Cubebs*, in which the medicinal virtue depends entirely upon a fluid substance, and can not be reduced to a solid extract, the fluid extract presents a valuable mode of administration. The menstruum employed in the preparation of fluid extracts varies according to the character of the constituents comprising the virtues of the plant; thus, many agents require only water, and those containing

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which when taken into the stomach or absorbed into the circulation, more or less disturb the normal action of the animal functions, are, when in their natural or unchanged condition, soluble in alcohol; while all those elements which are nutritive or capable of digestion and assimilation, and those which are *inert* or act only mechanically on the animal economy, are nearly if not absolutely insoluble in that menstruum.

Thus in the vegetable kingdom the fecula, gum, gluten, vegetable albumen, pectin, glucose, non-medicinal fixed oils, and other analogous principles which are digestible and support animal life, and also the lignin, wax, caoutchouc, etc., which are inert, are all insoluble, or nearly so, in pure alcohol; while all the *alkaloids* (at least when combined with their own native acids), the resinoids and oleo resins, acids and those fixed oils which are medicinal, are freely soluble in that agent. So also in the animal kingdom, the albumen, fibrin, gelatin, fat, etc., which are nutritive, are insoluble in alcohol, while all those peculiar secretions which are medicinal or poisonous, as musk, castor, the poison of serpents and insects, etc., and many peculiar secretions which are the result of disease, as the pus of small-pox, are soluble in that fluid. There may be some partial exceptions to this law, but it is believed they are so few as not to militate against its general application. It is not contended that it extends to all those numerous organic substances which are the results of destructive decomposition by heat or other artificial means; but to those which are the products of either healthy or diseased life, and it is with such chiefly we have to deal in vegetable pharmacy.

It is acknowledged that there are many vegetable substances from which alcohol alone will not readily extract the medicinal principles, but this is not because those principles are not themselves soluble in alcohol, but because they are so enveloped in and shielded by other elements which are not soluble in it, as woody fiber, wax, fatty oils, etc., that it can not reach them. They must therefore be first eliminated from such combination, so that this universal solvent of medicinal matter may come in contact with them. For this purpose we must employ water, dilute alcohol, ether, camphene, and perhaps acids and alkalies—all those appliances which pharmaceutical science and experience has taught us to use. But when once eliminated, and these first menstrua mostly removed, they are then freely soluble in alcohol alone, and this to the exclusion of the non-medicinal matter first extracted with them.

Acting on this hypothesis Mr. Merrell proposes a new series of fluid preparations very concentrated, definite and unalterable, which he believes will be superior in most cases, to any other pharmaceutical preparations. The general process for their preparation is as follows:

1st. If the plant or substance to be operated on contain any volatile oil, or other volatile elements, first draw these off and set them aside. This is best done not by distilling *over* in the usual way but by displacement with alcoholic vapor. The substance properly ground is put in a displacing vessel of convenient form, the lower end of which is connected with a cold receiver or condenser, and the top closed with a well luted cover. Through an opening in this the *vapor* of alcohol from a separate still is driven *down* oil and resin require alcohol or ether, according to the degree of solubility in these menstrua, and their action upon non-medicinal principles which may exist in the substance under operation. One great difficulty relative to fluid extracts is their natural tendency to decomposition; this may be obviated to a great extent by the addition of loaf-sugar, in the proportion of one ounce to every fluidounce of the extract; or other preservative agents may be employed in some cases, as alcohol, etc. When prepared by means of ether, these extracts generally keep well and for a long time, without any material unfavorable change.

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through the ingredients, and by an improved contrivance for the purpose is *partially* condensed *in* them and thus passes out into the receiver, carrying with it all the volatile elements and much of the other medicinal principles in a very concentrated form. Continue this until the passing vapor contains little or none of the aroma of the plant, then change the receiver and set aside the liquid collected. This in general, need not exceed one-fourth the weight of the ingredients acted on, if the process is skillfully conducted.

2d. Continue the displacement with alcohol and water in turn or in combination, and if necessary with ether, or acetic acid, until all the soluble elements of the article are perfectly extracted.

3d. From the liquid so obtained, draw off by the still or vacuum pan, the menstrua employed until the extract is reduced to a *semi-fluid* consistence, leaving sufficient liquid to allow the alcohol which is to be next used, to come freely in contact with all the particles, and yet not enough to sensibly dilute that solvent.

4th. Treat this semifluid extract with absolute alcohol, which according to the hypothesis advocated, will take up all the medicinal principles, and leave the nutritive and inert. In doing this a small portion of the alcohol may be first employed, say in proportion of half a pint to each pound of the original materials under treatment, and this when decanted or filtered off, may be added to the tincture obtained in the first part of the process that contains the volatile principles. Then wash the remaining extract with successive portions of alcohol until nothing more is dissolved, and distill off the alcohol from these weaker tinctures till the remainder when added to the previously reserved tinctures shall make the volume desired; mix, and if any turbidness remains, filter the whole through paper.

In general, a convenient standard of strength for most vegetable substances, will be that now usually adopted for fluid extracts, in which each fluidrachm of the tincture will represent and contain all the virtues of sixty grains of the crude article. But many articles may be made to a still greater concentration if it is found expedient.

The above described process will sufficiently illustrate the general principles on which these preparations are to be made, but this may in many cases be greatly modified, according to the character of the substances treated.

It is claimed that solutions or tinctures thus formed, will possess the following advantages over other medicinal preparations:

1st. They will fully retain all the volatile elements of the plants or materials from which they are prepared, while in all the fluid extracts heretofore introduced, these elements are partially dissipated, and in the "concentrated powders" and solid extracts, they are almost wholly lost.

2nd. In these tinctures the resinoid and oleo-resinous principles, are all obtained and held in perfect and permanent solution; while in the fluid extracts, where but a small part of the alcohol is retained, these principles can not be kept in solution, and must therefore either be removed to the great deterioration of the medicine, or else

FLUID EXTRACTS.

BY W. S. MERRELL.

In our article on the "Progress of Pharmacy," it was observed that the fluid extract was a new and very eligible form, in the present state of the science, of exhibiting many valuable remedies. The medical powers

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remain to form a muddy precipitate in the bottle, or if kept suspended by sugar, to make the preparation turbid and repulsive; as is seen in many of the fluid extracts heretofore introduced. Our best manufacturers of fluid extracts are now *approximating* the ground contended for, by increasing the alcoholic strength of their preparations.

3d. These tinctures will not only be clear and elegant, but when made from the most delicate and perishable substances, will not be liable to fermentation or decomposition, but will keep unaffected by *time* or *temperature.*

4th. They may be made of definite and uniform strength or nearly so, although the materials used be not uniformly of prime quality. For having made a sample of eligible strength from the best selected material, all subsequent preparations of the same article may be adjusted to the same strength by the specific gravity, or by the quantity of residuum left on evaporation. This can not be done in the common fluid extracts, as in them a great specific gravity and a large residuary extract may arise from the nutrient and inert matter present, with little or none of the medicinal element.

5th. In these tinctures the dose is so small, that the alcohol present, which in the old officinal tinctures often forbids their use, here ceases to be an objection. When prepared from roots, barks, leaves, flowers or seeds, they need never be of less concentration than that in which each *minim* of the tincture contains all the virtues of one *grain* of the material, so that the doses will seldom exceed thirty or forty drops, and of those articles used as sedatives and antiphlogistics, rarely more than one to five drops; and the cases must be rare in which such quantities of alcohol can exert an injurious influence. But if any such influence should be feared, it is easily obviated. Such concentrated agents should never be thrown undiluted upon the stomach, but should always be diffused when administered, in syrup, water, gruel, or other suitable vehicle. Now if any injurious effect be feared from the small quantity of alcohol in the required dose, it is only necessary to mix it in such vehicle warm, and the alcohol is soon dissipated, and the medicine itself left in combination with the liquid.

6th. These tinctures, containing as they do all the virtues of the plant separated from extraneous matter, and being of definite and known strength, may readily be diluted by alcohol into *officinal tinctures*, or be added to simple syrup to form beautiful and efficient *medicinal syrups*, or be evaporated to the pilular consistence and thus form most perfect and reliable *alcoholic extracts.*

As the terms "fluid extracts," "saturated tinctures," and "concentrated tinctures," have been appropriated to preparations heretofore known, and which are quite different from those here recommended; to avoid confusion it is proposed to designate these by the appropriate and easy spoken name of "*essential tinctures.*"

Messrs. Merrell & Co. are now proceeding to manufacture such tinctures from almost every article of the vegetable materia medica. Although the process of manufacture is much more difficult and expensive than that of the best fluid extracts, they propose offering them at about the same prices as are now charged for the most celebrated of those preparations.

The samples of these tinctures which we have examined, are certainly very fine preparations, and we hope experience will confirm the truth of the hypothesis in accordance with which they are made, and justify their high claims to superiority.

of vegetables, as has been stated, depend on certain proximate principles, as acids, essential oils, resinoids, alkaloids, etc., and to obtain these in their separate and pure state, constitutes the climax of pharmaceutical progress; but there are many valuable plants of which the requisite analysis has not been made; others, in which the principle in which the chief medical activity resides is combined with some native acid, or with other principles of an extractive or mucilaginous character, which modifies their pathogenetic action; and in other cases again, we wish to obtain, in combination, the medical properties of several articles, of which the proximate principles are diverse, and to obtain them pure would require separate and dissimilar processes. Now, as nearly all medical principles are soluble in alcohol, either pure or dilute, all these properties of an article or a compound, may be extracted by this menstruum, and presented together in their native state and proportions; and although such extracts are not as concentrated nor as definite in their strength as the pure proximate principles, yet, if skillfully prepared, they are sufficiently so for use in most cases.

The strength and quantity of Alcohol may properly be varied, as the ingredients are more or less resinous in their character. But the following formula will be found sufficiently definite in most cases:

℞ Ingredients to be extracted	one pound.
Alcohol, 76 per cent	four pints.
White Sugar	four ounces.
Water	a sufficient quantity.

Add to the ingredients, in a convenient close vessel, enough Alcohol to thoroughly wet them, and digest with as much warmth as can be used without distilling off the Spirit for twenty-four hours. Then transfer the whole to a percolator or displacement apparatus, and gradually add the rest of the Alcohol, returning a little of the first that comes through, till it runs clear. Reserve, by itself, of the first or strongest running, four fluidounces; evaporate the remaining Alcoholic Tincture that comes through to four fluidounces, and likewise set it aside. Then pour hot water on the residuum in the percolator, until the liquid that comes through has very little of the color or taste of the medicine; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of fluid extract. If necessary, from ten to twenty drops of any desired essential oil, as cloves, mint, or caraway, may be added to cover the taste and prevent nausea or griping.

This process is believed to be the best that can be pursued with the apparatus usually accessible to physicians and apothecaries. But the method pursued by me in preparing these Extracts, Syrups, etc., in larger quantities, secures the object in every respect more perfectly. This consists in placing the ingredients, previously ground, and in some cases macerated, into an appropriate vessel, in form like a common displacement apparatus or percolator, and driving the Alcohol, Water, or other menstruum, in the state of Vapor, downward through them.

Steam, or the Vapor of Alcohol, penetrates every fiber of vegetable substances much more readily and perfectly than liquids, and brings all their proximate principles, especially the Resinoids, into a soluble state; but *dry* steam has no solvent power; it may soften, and expand, and fuse, but it can not dissolve and carry out those principles, without a liquid as a vehicle. Therefore, to render the process perfect, we must obtain the combined action of Vapor and Liquid. Of Vapor to penetrate and soften, and of Liquid to dissolve and carry out.

The steam-displacement apparatus, patented by Mr. C. Augustus Smith, is designed to attain this object, but unless the process is conducted slowly and with much skill, it is done very imperfectly. For if the vapor be condensed at the top of the apparatus, which will be the case if the surrounding condenser be kept full of cold water, as directed, the menstruum will only percolate through in the state of liquid, and will effect no more than if poured on in the state of warm liquid. On the other hand, if the steam be not condensed above, but passes on through the ingredients dry, it affords no vehicle to carry with it the soluble substances. My mode perfects the process by obtaining the continually combined action of the solvent in Vapor and in Fluid. A full description of the apparatus, and all the steps of the process in using it, can not be given here without too greatly extending this article, nor could they be readily understood without the aid of appropriate drawings, and must, therefore, be omitted.

The lower end of the displacement vessel is connected with a worm, so that the liquid is fully condensed and cooled before it comes to the air. If the process be properly conducted, the first portions displaced by the vapor will be very strong, and contain most of the Aroma and Essential Oils belonging to the ingredients.

Therefore, to prepare a fluid extract by this process, of the standard strength of one fluidounce from one avoirdupois ounce of the substance, we displace with the Vapor of Alcohol, combined with sufficient Alcohol to serve as a vehicle. Of the first and strongest solution or tincture thus obtained, set aside a portion equal in weight to half the ingredients that are acted on. This contains a large portion of the strength, and nearly all the essential oil and aroma, and is not to be submitted to heat at all. Continue the process until the strength is exhausted, and the liquid comes through but little impregnated with the flavor of the substance. Then turn on the stream of water, until the Alcohol remaining in the substance can be driven out and condensed. From this second portion of solution distill off, at a low heat, in vacuo.

If the root or other substance is believed to contain any medicinal virtues not soluble in alcohol, then continue the operation with steam of water till these are extracted, and evaporate this watery solution to a semi-fluid extract. Mix this and the residuum from which the alcohol has been distilled, and add Refined Sugar equal to one-fourth of the ingredients used, and with a moderate heat evaporate the syrup to half the number of pints that there were pounds avoirdupois of the substance operated upon. To this, while simply warm, add the first solution that was obtained and set aside, and mix the two thoroughly. Then, if it be necessary, add a few drops of any essential oil, as before stated, to cover the taste, etc. Thus making from every pound of ingredients one pint of the fluid extract.

It may be asked, why so particular to use very moderate heat, or distill in vacuo, to reduce the liquid to the proper quantity, after having acted on it by steam during the process of obtaining it. The reply is: 1st, that the temperature of the vapor of alcohol is not so high, by many degrees, as that of boiling water; and 2d, it is not the heat itself that destroys these delicate substances, but it is by the combined action of heat and water, and in most cases, of air also, that the more easily destructible proximate principles are oxidized and rendered inert. It is not, therefore, heat alone, but long boiling in water that dissipates all the volatile principles, as the essential oils, and decomposes others, and thus renders extracts prepared in the ordinary way comparatively worthless.

All fluid extracts are not made according to the above standard of concentration. In the Fluid Extract of Lobelia, all the Alcohol is evaporated off, and only the oil and extractive left; this is, therefore, condensed only two or three ounces from the pound, according to the quality of the seed.

In the Fluid Extract of Stillingia, on the other hand, the concentration is less than half that of the above-named standard, as the medicine is so powerful that a greater degree of concentration is not thought expedient.

(In the preparation I now make under the name of 'Concentrated Fluid Extracts,' I use Alcohol only, having become satisfied that all the medical virtues of every plant are extracted by that menstruum, if properly managed. And by thus rejecting the starch, gum, and extractive that are dissolved by the water, we are able to make a preparation four times the above strength and still retain its fluidity. In most of our fluid extracts, therefore, each ounce contains the virtues of a quarter of a pound of the ingredients—and some contain much more.—*W. S. M.*)

Medical Syrups are prepared after the same method as the fluid extracts, with the exception that they are less concentrated, and less alcohol and more sugar is employed in their composition. For, as they are taken in proportionably larger doses, the presence of spirit in them would be more appreciable and injurious.—*See Tilden on Fluid Extracts, p.* 1011.

As the fluid extracts of the several articles which have been thus far employed vary considerably in their mode of being manufactured, it has been deemed best to explain these several methods under their appropriate heads in the following preparations:

EXTRACTUM ANTHEMIDIS FLUIDUM. *Fluid Extract of Chamomile.*

Preparation.—Take of bruised Chamomile Flowers *twelve ounces;* Alcohol, Water, of each, *a sufficient quantity.* Mix the Chamomile with a sufficient quantity of Alcohol, and allow it to stand for twenty-four hours; then transfer it to a percolator and pour Alcohol gradually upon it until a pint and a half of filtered liquid is obtained. Place this in an evaporating dish, and allow it to evaporate spontaneously until reduced to six fluidounces.

To the Flowers in the percolator, add gradually a sufficient quantity of Water until it passes without any of the taste of the Chamomile. Evaporate this portion in a water-bath to six fluidounces.

Mix together the alcoholic and aqueous solutions.

Properties and Uses.—This Fluid Extract of Chamomile Flowers is a tonic, and possesses all the properties of the crude article. Each fluidounce of the Extract represents a fluidounce of the Flowers; hence the dose is from half a fluidrachm to a fluidrachm three times a day. It may be advantageously combined with the fluid extracts of cimicifuga, valerian, cypripedium, scutellaria, etc.

EXTRACTUM BUCHU FLUIDUM. *Fluid Extract of Buchu.*

Preparation.—Take of the coarsely powdered Leaves of Buchu *eight ounces;* Ether *four fluidounces;* Alcohol *twelve fluidounces;* Diluted Alcohol, or good Holland Gin, *a sufficient quantity.* Mix the Ether and Alcohol, and having incorporated the Buchu with one-half of the mixture, introduce it into a percolator, and gradually pour in the remainder. Then add Diluted Alcohol or good Holland Gin until the whole liquid which has passed shall amount to a pint. Put the Ethereal Liquid thus obtained into a shallow vessel, and allow it to evaporate spontaneously until reduced to five fluidounces. Upon the mass in the percolator pour gradually Diluted Alcohol or good Holland Gin until ten fluidounces of Tincture have passed. With this mix the five fluidounces left after the spontaneous evaporation, taking care to dissolve in a little Alcohol any oleoresinous matter which may have been deposited, and to add it to the rest. Allow the mixture to stand, with occasional agitation, for four hours, and then filter. The resulting fluid extract should measure a pint; and if it be less than that quantity, the deficiency should be supplied by the addition of good Holland Gin.—*Wm. Procter, jr.* Mr. H. N. Rittenhouse in making this fluid extract, adds *a drachm* of Carbonate of Potassa to *eight ounces* of Buchu Leaves, in powder, then *six fluidounces* of Ether mixed with *one pint* of Alcohol. These after being well mixed are allowed to macerate for twenty-four hours, then transferred to a percolator, and Diluted Alcohol poured on until a pint of ethereal liquor is obtained, which is set aside and allowed to evaporate spontaneously until reduced to four fluidounces. Upon the mass in the percolator pour on Water mixed with *one-fourth* of its bulk of Alcohol, and holding in solution *three drachms* of Carbonate o Potassa; when a pint of liquor is obtained, remove the dregs, and express them until another pint is obtained, washing them with Water if necessary to make up the measure; mix this with the pint last obtained, and evaporate on a water-bath to four fluidounces; add this to the four fluidounces left after the spontaneous evaporation. As thus prepared it is a perfect preparation, of a dark-green color, and of the taste and odor of the leaves. The Carbonate of Potassa dissolves two constituents of the plant soluble in alkali.—*Am. Jour. Pharm.*, *XXVI.*, 484.

Properties and Uses.—Fluid Extract of Buchu is a gently stimulating diuretic, and may be used in chronic catarrh of the bladder, gravel, morbid irritation of the bladder and urethra, and other affections of the urinary organs. The dose is one or two fluidrachms, three times a day.

EXTRACTUM CIMICIFUGÆ FLUIDUM. *Fluid Extract of Black Cohosh.*

Preparation.—Take of recently dried Black-Cohosh Root, in moderately fine powder, *sixteen Troy ounces;* Alcohol *one pint;* Ether *half a pint;* Diluted Alcohol *a sufficient quantity.* Mix the Cohosh with an equal weight of Sand, moisten it with a portion of the Alcohol, transfer it to a displacement apparatus for volatile liquids, and pour on the remainder of the Alcohol and the Ether. When the liquid commences to pass, close the orifice so that its passage shall be by drops; and when the menstruum disappears above, immediately add Diluted Alcohol until the filtered tincture measures a pint and a half. Set this aside in a capsule in a warm place until it is reduced to half a pint, and has lost its ethereal odor.

Meanwhile, continue the percolation with Diluted Alcohol until two pints more tincture are obtained. Evaporate this in a water-bath to eight fluidounces, and mix it gradually with the first product so as to avoid as much as possible the precipitation of the resin from the latter. After standing a few hours the fluid extract should be filtered, and if it does not measure a pint add a sufficient quantity of Alcohol to make that measure.

If the amount of resin precipitated is considerable, it may be separated by a cloth-strainer, redissolved in a little Alcohol, and added to the solution, which should then be filtered.

History.—This fluid extract is prepared after the manner of W. Procter, Jr. It has a dark reddish-brown color like laudanum, is transparent, and possesses the bitter, disagreeable taste of the root in a marked degree. Its flavor may be improved by the addition of one pound Avoirdupois of white sugar, and a small portion of some aromatic essence.

Mr. James C. Leamy, of Baltimore, Md., prepares the fluid extract by adding to coarsely powdered Cimicifuga *eight ounces*, a mixture of Alcohol *eight fluidounces*, and Ether *four fluidounces*, and digesting for twenty-four hours. Then remove to a percolator, and displace twelve fluidounces, adding enough Dilute Alcohol to make up the quantity, which should then be spontaneously evaporated to five fluidounces. Add Diluted Alcohol to the dregs, and continue the displacement until eight fluidounces have passed, then mix the two tinctures together, digest the residue left in the displacer for one hour in boiling water, strain, and evaporate to two fluidounces, mix it with the tincture, and after standing forty-eight hours filter. *Am. Jour. Pharm. XXVII.*, 515.

Properties and Uses.—The Fluid Extract of Black Cohosh possesses tonic, narcotic, antispasmodic, alterative, and emmenagogue properties. It may be used with advantage in rheumatism, neuralgia, scrofula, syphilis, amenorrhea, dysmenorrhea, chorea, and all diseases in which the root is indicated. The dose is from half a fluidrachm to two fluidrachms.

EXTRACTUM CINCHONÆ FLUIDUM. *Fluid Extract of Cinchona.*

Preparation.—Take of Calisaya Bark, in a uniform coarse powder, *eight Troy ounces*, moisten it with Diluted Alcohol, and after standing twelve hours, pack the moist Bark properly in a percolator, and pour Diluted Alcohol on it gradually until four pints of tincture have passed, or until its bitterness is exhaused. Evaporate the tincture in a water-bath (or a still), to nine fluidounces; then add of Sugar *fourteen Troy ounces*, continue the heat until it is dissolved, and strain while hot.

Properties and Uses.—Same as Peruvian bark, and may be used alone or in combination with other agents. Dose, one fluidrachm.—*A. B. Taylor.*

EXTRACTUM CORNUS FLORIDÆ FLUIDUM. *Fluid Extract of Dogwood.*

Preparation.—Take of Dogwood Bark, in coarse powder, *one pound;* Alcohol 76 per cent., *four pints;* White Sugar *six ounces;* Water *a sufficient quantity.* Moisten the Bark thoroughly with Alcohol and let it stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining alcoholic tincture that comes through to four fluidounces, and likewise set it aside. To the Powder in the percolator add gradually cold Water *a sufficient quantity*, until the liquid that passes is but slightly impregnated with the properties of the Dogwood; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces and while warm, mix in the reserved Tincture and Extract, and make onepint of Fluid Extract.

Properties and Uses.—Fluid Extract of Dogwood is tonic, stimulant, and slightly astringent. It may be used in all cases where tonics are indicated, and will be found beneficial in female debility, leucorrhea, etc. The dose is from half a fluidrachm to two fluidrachms.

EXTRACTUM CUBEBÆ FLUIDUM. *Fluid Extract of Cubebs.*

Preparation.—Carefully place Powdered Cubebs *a pound*, into a displacement apparatus, and gradually pour Ether upon it. When two pints of ethereal tincture have filtered through, remove it into a retort on a water-bath, and by a moderate heat distill off a pint and a half of the Ether. The residue may be placed in a shallow evaporating dish, and the balance of the Ether be allowed to evaporate spontaneously.— *W. Procter, jr.*

This substance consists of all the volatile oil, cubebin, and resin, most of waxy matter, and none of the extractive of cubebs, and hence embraces all the active principles of the plant. It is of a dark olive-brown color, and possesses the odor, taste, and virtues of the drug. The waxy matter, and cubebin are deposited upon standing a long time.—*Am. Jour. Pharm.*, *XVIII.*, 167.

Properties and Uses.—This preparation possesses the virtues of cubebs, and may be given in the dose of from ten to thirty minims, in emulsion, or in capsules, and repeated three times a day.

EXTRACTUM CYPRIPEDII FLUIDUM. *Fluid Extract of Yellow Ladies'-slipper Root.*

Preparation.—Take of Yellow Ladies'-slipper Root, in coarse powder *one pound;* Alcohol 76 per cent., *four pints;* White Sugar *six ounces;* Water *a sufficient quantity.* Moisten the Root thoroughly with some of the Alcohol, and let it stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, until it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining alcoholic tincture that comes through to four fluidounces; and likewise set it aside. To the Powder in the percolator add gradually *a sufficient quantity* of cold Water, until the liquid that passes is but slightly impregnated with the properties of the Cypripedium; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—The Fluid Extract of Cypripedium is tonic, nervine, and antispasmodic and may be beneficially employed in chorea, hysteria, nervous headache, and all cases of nervous irritability and excitability. A few drops of oil of anise may be added to it to improve its flavor. The dose is from half a fluidrachm to a fluidrachm three times a day.—*J. K.*

EXTRACTUM EPIGÆÆ FLUIDUM. *Fluid Extract of Trailing Arbutus.*

Preparation.—Take of the recently dried Leaves of Epigæa Repens, in coarse powder, *one pound;* Alcohol, 76 per cent., *four pints;* White Sugar *six ounces;* Water *a sufficient quantity.* Moisten the Leaves thoroughly with some of the Alcohol, and let it stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, until it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining alcoholic tincture that comes through to four fluidounces, and likewise set it aside. To the powder in the percolator add gradually *a sufficient quantity* of cold Water, until the liquid that passes is but slightly impregnated with the taste of the Leaves; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—The Fluid Extract of Trailing Arbutus possesses diuretic and astringent properties, and will be found superior to the preparations of uva ursi, buchu, etc., in gravel, and various other disorders of the urinary organs. It may likewise be used in chronic diarrhea and summer complaint; the dose is one fluidrachm, three or four times a day.—*J. K.*

EXTRACTUM ERGOTÆ FLUIDUM. *Fluid Extract of Ergot.*

Preparation.—Take of fresh Ergot, in powder, *eight ounces;* Ether *four fluidounces;* Alcohol *twelve fluidounces;* Water *a sufficient quantity.* Moisten the Ergot with some of the Ether, let it stand for twenty-four hours, and then transfer to a percolator, and add gradually the remainder of the Ether. When all has passed through, allow the Ethereal Tincture to evaporate spontaneously. To the Powder in the percolator add gradually the Alcohol, and when all has passed, evaporate the filtered tincture to four fluidounces. Again add gradually to the Powder in the percolator, a sufficient quantity of Water, until the liquid passes without the taste of the Ergot; evaporate this liquid to four fluidounces, and add to it *six ounces* of White Sugar, and again evaporate to four fluidounces. Mix the alcoholic and aqueous solutions while hot, and when cold add the residuum of the evaporated Ethereal Tincture, and thoroughly incorporate by agitation.—*W. Procter*, *Jr.*

History.—The ether in this preparation takes up a portion of the active principle in combination with the inert fixed oil; while the other agents, undoubtedly, take up certain proportions of the active principle not touched by the ether. The spontaneous evaporation of the ether gives the oil and active principle combined, and which must be well mixed with the other solutions. The heat, in evaporating the alcoholic and aqueous solutions, should be below 212°. As there is yet some doubt in relation to the active principle of Ergot, a preparation which will represent the drug in its natural form is desirable, and which is had in this fluid extract.

Mr. W. J. Watson prepares a fluid extract by macerating freshly powdered Ergot *four Troy ounces* in Diluted Alcohol *one pint* (made of Alcohol 95 per cent. one part. mixed with water four parts) for four days, then transfer to a percolator, and when the liquid ceases to pass, pour on water until two pints have passed; evaporate to six fluidounces by water-bath, and add Alcohol *six fluidounces;* let it stand with occasional agitation for twelve hours, and filter. It is of a Madeira-wine color, possessing a strong taste and odor of Ergot. One fluidrachm represents one scruple of Ergot. —*Am. Jour. Pharm. XXVIII.*, 519. Also same Journal, XXVII., 302, for Mr. T. R. Baker's process.

Properties and Uses.—This fluid extract may be used as a substitute for ergot in all cases; it is pleasant to the taste, is always ready for use, requires a small dose, and acts promptly without nausea. The dose is from half a fluidrachm to a fluidrachm; the latter dose is about equal to two doses of powdered ergot.

EXTRACTUM GENTIANÆ FLUIDUM. *Fluid Extract of Gentian.*

Preparation.—Take of Gentian, in coarse powder, *sixteen Troy ounces;* French Brandy *six fluidounces;* Water *a sufficient quantity.* Macerate the Gentian in two and a half pints of Water for twelve hours, and having introduced it into a percolator, allow the infusion to pass slowly, adding gradually Water until five pints of liquid have passed. Evaporate this to ten fluidounces by means of a water-bath, add the Brandy, and strain through cotton flannel.

History.—This extract has a thin syrupy consistence, a dark brown color, free from sediment, and transparent in thin strata. With water it forms a clear mixture.

Properties and Uses.—Tonic, and may be given in doses of from half a fluidrachm to a fluidrachm, which represent half a drachm to a drachm of Gentian Root. It may be variously combined with other agents to meet particular indications. For instance, should an aperient tonic with antacid properties be desired, the following form may be used: Take of Fluid Extract of Gentian *two fluidounces;* Fluid Extract of Rhubarb *two fluidrachms;* Bicarbonate of Potassa *one drachm;* Tincture of Ginger *two fluidrachms.* Mix. One fluidrachm of this mixture will be equal to about forty grains of gentian, six of rhubarb, and three of bicarbonate of potassa.

If a chalybeate tonic is desired, the following may be employed: Take of Citrate of Iron and Quinia *one drachm;* Water *six fluidrachms;* dissolve and add Fluid Extract of Gentian *two fluidounces.* A fluidrachm of this mixture will represent about forty-five grains of gentian, and three grains of citrate of iron and quinia.—*Wm. Procter, Jr.*

EXTRACTUM GENTIANÆ FLUIDUM COMPOSITUM. *Compound Fluid Extract of Gentian.*

Preparation.—Take of Gentian, in coarse powder, *sixteen Troy ounces;* Bitter Orange-Peel, Coriander Seeds, of each, in coarse powder, *four ounces;* Water, Alcohol, of each, *a sufficient quantity.* Macerate the Gentian in two and a half pints of Water for twelve hours, and introduce it into a percolator; allow the infusion to pass slowly, adding Water at intervals until five pints of liquid have passed. Evaporate this to ten fluidounces. Macerate the Orange Peel and Coriander Seeds in a mixture of *eight fluidounces* of Alcohol, and *four fluidounces* of Water for twelve hours; introduce them into a percolator, and add gradually *a sufficient quantity* of Diluted Alcohol to displace twelve fluidounces of tincture. Evaporate this to six fluidounces by a gentle heat (120° F.), add it to the solution of Gentian while hot, and strain. When finished, the Fluid Extract should measure a pint.—*Wm. Procter, Jr.*

History.—The Compound Fluid Extract of Gentian is a colored, thin, syrupy liquid. In the preparation of it I should prefer Prickly-Ash Berries to the Coriander, both on account of their flavor, and well-known influence on mucous tissues.

Properties and Uses.—Tonic and carminative, and may be given in doses of from half a fluidrachm to a fluidrachm.

EXTRACTUM HYDRANGEÆ FLUIDUM. *Fluid Extract of Hydrangea.*

Preparation.—Take of the Root of Hydrangea *one pound;* Water *six pints or a sufficient quantity;* Honey *two pints.* Boil the root for a long time in successive portions of water, add the Honey, and evaporate to two pints. —*W. Procter, jr.*

Properties and Uses.—Valuable in irritable conditions of the urethra and bladder, from the presence of stone or gravel, etc., and to change the character of lithic urine. The dose is from half a fluidrachm to a fluidrachm.

EXTRACTUM HYOSCYAMI FLUIDUM. *Fluid Extract of Henbane.*

Preparation.—Take of the recently dried Leaves of Henbane, in coarse powder, *eight Troy ounces;* Diluted Alcohol *a sufficient quantity;* Sugar *eight Troy ounces.* Macerate the Henbane in a pint of Diluted Alcohol for twenty-four hours, transfer it to a percolator, and add gradually Diluted Alcohol, until three pints of tincture have passed. Evaporate the tincture to ten fluidounces, and dissolve the Sugar in it while hot; when cold add Alcohol, sp. gr. 0.835, *two fluidounces*, or sufficient to make a pint of Fluid Extract, and strain through fine muslin.

History.—This forms an elegant and durable preparation of Hyoscyamus. In percolation the fluid should be allowed to pass very slowly, that thorough exhaustion of the leaves may take place.

Properties and Uses.—This extract possesses all the virtues of Hyoscyamus, and may be given wherever the influence of the plant is desired. The dose is from ten to sixty minims.—*C. A. Smith.*

EXTRACTUM IRIDIS FLUIDUM. *Fluid Extract of Blue Flag.*

Preparation.—Take of recently dried Blue-Flag Root, in coarse powder, *eight ounces;* Ether *four fluidounces;* Alcohol *twelve fluidounces;* Diluted Alcohol *a sufficient quantity.* Mix the Ether and Alcohol, and having incorporated the Blue Flag with one-half of the mixture, introduce the mass into a percolator, and gradually pour in the remainder. Then add Diluted Alcohol until the whole liquid which has passed shall amount to a pint. Put the Ethereal liquid thus obtained into a shallow vessel, and let it evaporate spontaneously until reduced to five fluidounces.

Upon the mass in the percolator pour gradually Diluted Alcohol until ten fluidounces of tincture have passed, and evaporate to five fluidounces. With this mix the five fluidounces left after spontaneous evaporation, taking care to dissolve in a little Alcohol any oleo-resinous matter which may have been deposited, and to add it to the rest. Allow the mixture to stand, with occasional agitation, for four hours, and filter. The resulting Fluid Extract should be ten fluidounces; and if it be less than that quantity, the deficiency should be supplied by the addition of Alcohol.

Properties and Uses.—This holds the virtues of Blue Flag in a concentrated state, and may be used in syphilis, dropsy, scrofula, and all diseases in which the crude article is indicated. The dose is from ten to thirty minims.—*J. K.*

EXTRACTUM LEPTANDRÆ FLUIDUM. *Fluid Extract of Blackroot.*

Preparation.—Take of the recently dried Root of Leptandra Virginica, in coarse powder, *one pound;* Alcohol, 80 per cent., *four pints;* White Sugar *four ounces;* Water *a sufficient quantity.* Add to the Root, in a convenient close vessel, enough Alcohol to thoroughly moisten it, and let the mixture stand for twenty-four hours; then transfer it to a percolator, and add gradually the rest of the Alcohol, returning a little of the first that comes through, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic Tincture that comes through to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that passes has very little of the color or taste of the Blackroot; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—This extract is laxative, cholagogue, and tonic, and may be advantageously substituted for the root in all cases. The dose is from ten to sixty minims, one, two, or three times a day. As a laxative it is preferable to Leptandrin.—*J. K.*

EXTRACTUM LOBELIÆ FLUIDUM. *Fluid Extract of Lobelia.*

Preparation.—Mr. Procter employs the following process in preparing a Fluid Extract of Lobelia Herb: Macerate for twenty-four hours, Lobelia, finely bruised, in Diluted Alcohol *one pint and a half*, and Acetic Acid *one fluidounce;* introduce the mixture into an earthen displacer, and pour on slowly Diluted Alcohol *one pint and a half*, and afterward Water until three pints of tincture are obtained; evaporate this in a water-bath to ten fluidounces, strain, add Alcohol *six fluidounces*, and when mixed filter through paper. This process is based on the fact, that in the presence of an excess of acid, the lobelina of the natural salt, which gives activity to the drug, is not decomposed and destroyed by the heat used. A fluidrachm of this extract is equal to half a fluidounce of the tincture.

That which is commonly used in the West is prepared according to the previous instructions by W. S. Merrell.

Properties and Uses.—The Fluid Extract of Lobelia possesses all the properties of the plant in a concentrated degree. It may be used wherever lobelia is indicated. The dose is from five minims to a fluidrachm, according to the effect required; and which are equivalent to five grains or a drachm of the powder.

EXTRACTUM LOBELIÆ FLUIDUM COMPOSITUM. *Compound Fluid Extract of Lobelia.*

Preparation.—Take of recently dried Bloodroot, Skunkcabbagreoot, and Lobelia Seeds and Leaves, of each, coarsely powdered, *five ounces and a half;* Alcohol, 80 per cent., *four pints;* White Sugar *four ounces;* Water *a sufficient quantity.* Moisten the articles mixed together with sufficient Alcohol, and let them stand for twenty-four hours; then transfer the mixture to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first or strongest running, four fluidounces; evaporate the remaining Alcoholic tincture that comes through to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that comes through has very little of the color or taste of the medicine; evaporate this latter solution to half a pint, by a heat considerably below the boiling point, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—This fluid extract is emetic, expectorant and antispasmodic, and may be used as a substitute for the acetated tincture of bloodroot. A fluidrachm of the extract is equivalent to about a drachm of the powder; the dose is from ten to sixty minims according to the desired effect.—*W. S. M.*

EXTRACTUM LUPULINÆ FLUIDUM. *Fluid Extract of Lupulin.*

Preparation.—Take of Lupulin *four ounces* (Troy); Alcohol, Rectified Ether, each, *a sufficient quantity.* Put the Lupulin in a glass displacer, pour upon it four fluidounces of Ether, and then sufficient alcohol to obtain six fluidounces by slow percolation, and set the liquid aside. Then continue the displacement with alcohol till ten fluidounces of liquid passes. Evaporate this to two fluidounces, and mix it with the ethereal tincture, and by means of a water-bath at 100° F., or spontaneously, let the ether evaporate, so that the resulting fluid extract shall measure four fluidounces.

History.—Lupulin contains about one per cent. of valerianic acid, a volatile oil, and a considerable quantity of yellow resin, beside a bitter principle; hence, in treating it to get a concentrated solution, a process must be pursued which will retain the volatile principles in the preparation when finished.

Properties and Uses.—This fluid extract may be used wherever lupulin is indicated; a fluidrachm is equivalent to a drachm of lupulin, so the dose can be readily proportioned. It may be advantageously combined, at times, with fluid extract of scutellaria, wild cherry, or valerian, etc.

EXTRACTUM POLYGONI FLUIDUM.—*Fluid Extract of Water-pepper.*

Preparation.—Take of the recently dried Leaves of Water-pepper, in coarse powder, *one pound;* Alcohol, 76 per cent., *four pints;* White Sugar *four ounces;* Water *a sufficient quantity.* Moisten the Leaves thoroughly with Alcohol, and let them stand for twenty-four hours; then transfer hem to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that comes through, till it passes clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that passes to four fluidounces, and likewise set it aside. Then gradually add a *sufficient quantity* of Water to the residuum in the percolator, until the liquid that comes through has very little of the color or taste of the Water-pepper; evaporate this latter solution to half a pint, then add the Sugar; continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Water-pepper possesses the properties of the herb in a concentrated form, and may be given whenever that is indicated. It is especially useful in uterine diseases. The dose is from ten to sixty minims, three or four times a day.

EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM. *Fluid Extract of Wild-Cherry Bark.*

Preparation.—Take of Wild-Cherry Bark *twenty-four ounces* (Troy); Sweet Almonds *three ounces* (Troy); Pure Granulated Sugar *thirty-six ounces* (Troy); Alcohol 88 per cent. and Water, each, *a sufficient quantity.* Macerate the powdered Bark in two pints of Alcohol for eight hours, introduce it into a percolator and pour on Alcohol till five pints have passed, observing to regulate the passage of the liquid by a cork or stopcock. Introduce the tincture into a capsule (or distillatory apparatus, if the Alcohol is to be regained), and evaporate it to a syrupy consistence; add half a pint of Water, and again evaporate till the Alcohol is entirely removed. Beat the Almonds, without blanching, into a smooth paste with a little of the water, and then add sufficient to make the emulsion measure a pint and a half, and pour it in a quart bottle previously containing the solution of the extract of the Bark, cork it securely, and agitate occasionally for twenty-four hours, so as to give time for the decomposition of the amygdaline. The mixture is then to be quickly expressed and filtered into a bottle containing the Sugar, marked to hold three pints. Water should be added to the dregs, and they again expressed till sufficient filtered liquid is obtained to make the fluid extract measure three pints.

History.—This extract is a dark, wine-red, transparent liquid, not syrupy in consistence, and possessed of a bitter, hydrocyanic taste. None of the oil of almonds is retained. If it be desired to make a preparation free from astringency, strips of isinglass, previously softened in water, may be added to the aqueous solution, which will remove the tannic acid.—*Wm. Procter, Jr.* Tilden & Co., of New York, prepare a very superior Fluid Extract of Wild-Cherry Bark.

Properties and Uses.—This may be used wherever Wild-Cherry Bark is indicated. One fluidrachm of it represents thirty grains of the bark, two fluidounces of the infusion, or a tablespoonful of the syrup. Four fluidounces of this fluid extract may be added to twelve fluidounces of simple syrup to form a syrup of wild-cherry bark.

EXTRACTUM RHEI FLUIDUM. *Fluid Extract of Rhubarb.*

Preparation.—Take of coarsely powdered Rhubarb Root *eight ounces* [Troy]; White Sugar *five ounces;* Diluted Alcohol *two pints.* Mix the Rhubarb with an equal bulk of coarse sand; moisten it with sufficient of the Diluted Alcohol to form a pasty mass, and allow it to stand for an hour, or until the particles are thoroughly impregnated and swollen with the liquid. Then introduce the mass into a displacer, and shake it until it has settled uniformly, carefully pour on the rest of the Diluted Alcohol, and cover with a piece of paper or cloth. When the liquid which passes through has but little of the odor or taste of the root, remove it to an evaporating dish in a water-bath, and evaporate until it measures five and a half fluidounces; then add the Sugar, and when dissolved the whole should measure eight fluidounces.—*Wm. Procter, jr.*

This fluid extract has a dark color in mass; is transparent in thin layers; has a strong odor and taste of the drug, somewhat modified by the sugar, and the specific gravity 1.30. When mixed with water the solution is slightly turbid, owing to a little resinous matter. It is permanent in its character, and contains no aromatics to mask the taste, nor stimulating oils to contra-indicate its use in acute diseases. The heat employed in its preparation should be moderate.

Properties and Uses.—This is an excellent and efficient preparation, containing all the medicinal virtues of the rhubarb, and may be administered in all cases where that drug is admissible. The dose for an adult is from half a fluidrachm to a fluidrachm, which are equivalent to similar quantities of the root. When it is desired to disguise the taste in cases where stimulants are not contra-indicated, six or eight fluidrachms may be added to the above eight fluidounces, of a mixture composed of equal parts of tincture of prickly-ash berries, tincture of ginger, and essence of sassafras.

EXTRACTUM RHEI ET POTASSÆ FLUIDUM. *Fluid Extract of Rhubarb and Potassa. Fluid Neutralizing Extract.*

Preparation.—Take of the root of the best India Rhubarb, and Bicarbonate of Potassa, of each, *two pounds, Avoirdupois;* Cassia or Cinnamon, and Golden Seal, of each, *one pound;* good French Brandy, fourth proof, *one gallon;* Oil of Peppermint *one fluidrachm;* Refined Sugar *three pounds;* Water *a sufficient quantity.* Grind, or coarsely bruise the Rhubarb, Cassia, and Golden Seal, and mix them. Macerate them for twenty-four hours, or longer in the Brandy; then express the tincture with strong pressure, and add to it the Oil of Peppermint previously dissolved in a little Alcohol. Break up the cake, or compressed residue from the press, place it in a percolator, and gradually add warm Water, until the strength of the articles is exhausted. Evaporate this solution to four pints, and while the liquor is still hot, dissolve in it the Bicarbonate of Potassa and Refined Sugar. Continue the evaporation, if necessary, until, when added to the tincture first obtained, it will make one gallon and a half of fluid extract, and mix the two solutions together. In adding the Bicarbonate of Potassa the liquid must not be too hot, else it will become the sesquicarbonate.

Properties and Uses.—This is an elegant and superior preparation, being an improvement upon the Neutralizing Cordial. It is used for the same diseases as the compound powder of rhubarb, and is a more eligible form of administration. Two fluidrachms of this fluid extract are equivalent to one drachm of the powder.—*W. S. M.*

EXTRACTUM RHUS FLUIDUM. *Fluid Extract of Sumach.*

Preparation.—Take of the recently dried Bark of Rhus Glabrum, in coarse powder, *one pound;* Alcohol, 76 per cent., *four pints;* White Sugar *four ounces;* Water *a sufficient quantity.* Add sufficient Alcohol to the bark to thoroughly moisten it, and let it macerate for twenty-four hours; then transfer the mixture to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remainder of the Alcoholic tincture that passes, to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that comes through has very little of the taste of the Sumach; evaporate this latter solution to half a pint, then add the Sugar; continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—The Fluid Extract of Sumach is tonic, astringent, and antiseptic. It will be found beneficial in scrofula, gonorrhea, diarrhea, dysentery, and in mercurial sore mouth and salivation. The dose is from half a fluidrachm to a fluidrachm, three times a day.

EXTRACTUM SARSAPARILLÆ FLUIDUM COMPOSITUM. *Compound Fluid Extract of Sarsaparilla.*

Preparation.—Take of Sarsaparilla-root, cut in pieces and bruised, *a pound;* Liquorice-root, bruised, *two ounces;* Mezereon, in small pieces, Yellow-Dock Root, sliced and bruised, of each, *an ounce;* Diluted Alcohol *eight pints;* White Sugar *twelve ounces.* Place all the articles, with the exception of the Sugar, in the Diluted Alcohol, and allow them to macerate for fourteen days; then express and filter. Place the filtered liquid in an evaporating dish over a water-bath, and evaporate to twelve fluidounces, and add the Sugar while hot. As soon as the Sugar has dissolved, remove from the bath, and flavor with a mixture of equal parts of Tincture of Prickly-Ash Berries and Essence of Sassafras. This formula is an improvement upon the one offered by W. Hodgson, jr., in the *Phil. Coll. of Pharm. Jour. II.*, 285.

Properties and Uses.—This fluid extract is alterative, and may be used in scrofula and secondary syphilis. The dose is a fluidrachm, which is equivalent to a drachm of the root, three or four times a day.

EXTRACTUM SCUTELLARIÆ FLUIDUM. *Fluid Extract of Scullcap.*

Preparation.—Take of the recently dried Leaves of Scullcap, in coarse powder, *one pound;* Alcohol, 76 per cent., *four pints;* White Sugar *four ounces;* Water *a sufficient quantity.* Add a sufficient quantity of the Alcohol to the Scullcap to thoroughly moisten it, and allow the mixture to macerate for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that comes through, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that passes to four fluidounces, and likewise set it aside. Then pour gradually on the residuum in the percolator a sufficient quantity of Hot Water, until the liquid that passes is but slightly impregnated with the properties of the Scullcap; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Scullcap is tonic, nervine, and antispasmodic, and is a very convenient and eligible form of administering the active principles of the plant. It may be used in all cases where the herb is indicated. The dose is from half a fluidrachm to a fluidrachm, three or four times a day.—*J. K.*

EXTRACTUM SENECII FLUIDUM. *Fluid Extract of Life-root.*

Preparation.—Take of the recently dried Herb Senecio Aureus, in coarse powder, *one pound;* Alcohol, 76 per cent., *four pints;* White Sugar *four ounces;* Water *a sufficient quantity.* Add a sufficient quantity of the Alcohol to the Herb to thoroughly moisten it, and allow the mixture to macerate for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remaining Alcoholic tincture that passes to four fluidounces, and likewise set that aside. Then pour gradually on the residuum in the percolator a sufficient quantity of Hot Water, until the liquid that passes is but slightly impregnated with the properties of the Life-root Herb; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—This fluid extract possesses the medicinal virtues of the Life-root, and forms a useful agent in amenorrhea, either alone, or in combination with the fluid extracts of black cohosh, water-pepper, etc. It may, likewise, be used advantageously in the other diseases in which the root is found efficient. The dose is from half a fluidrachm to a fluidrachm, three or four times a day.—*J. K.*

EXTRACTUM SENNÆ FLUIDUM. *Fluid Extract of Senna.*

Preparation.—Take of Senna, coarsely powdered, *thirty-two ounces;* Diluted Alcohol *four pints;* Water *one gallon;* Sugar *twenty ounces;* Oil of Fennel *sixty-four drops;* Hoffman's Anodyne about *two fluidrachms.* Mix the Senna and Alcohol, and let them macerate for twelve hours; then introduce them into a displacement apparatus, and, by means of the

Water, filter through one and a half gallons of fluid; evaporate this carefully to twenty fluidounces, and while hot, add the Sugar. When this is dissolved, strain, and when cold, add the Oil of Fennel dissolved in the Hoffman's Anodyne, which last article is added to check a tendency to ferment.—*Duhamel.*

Prof. W. Procter, Jr., has improved upon this formula as follows: Take of Senna, well bruised, *sixteen ounces* (Troy); Diluted Alcohol *a sufficient quantity;* Oil of Caraway, Oil of Anise, each, *sixteen drops;* Sugar *twelve ounces.* Macerate the Senna in two pints of the Diluted Alcohol, for twenty-four hours; then introduce them into a displacement apparatus, and add Diluted Alcohol until four pints pass through. Evaporate this in a water-bath to ten fluidounces, and while hot, add the Sugar; when this is dissolved, remove from the fire, and add the Oils, dissolved in the least possible quantity of Diluted Alcohol.

Properties and Uses.—This forms a neat preparation of Senna. The dose for an adult is half a fluidounce.

Dr. H. Thayer, of Cambridge, Mass., prepares this fluid extract by macerating Senna *two and a half pounds* in Cold Water *a sufficient quantity*, then transferring it to a percolator, and displacing as long as the liquor shows strength; add Sugar *seven ounces* to the infusion, evaporate to twenty-six fluidounces, and then add a mixture of Oil of Fennel, Oil of Caraway, each, *fifteen minims*, Alcohol *six fluidounces.* Mix well, allow the precipitate to subside, and decant the clear liquid for use.—*Am. Jour. Pharm., XXIX.*, 102.

EXTRACTUM SENNÆ ET JALAPÆ FLUIDUM. *Fluid Extract of Senna and Jalap. Fluid Extract of Antibilious Physic.*

Preparation.—Take of Senna, in coarse powder, *one pound;* Jalap Root, in coarse powder, *half a pound;* Alcohol, 76 per cent., *six pints;* Carbonate of Potassa *six drachms;* White Sugar *eight ounces;* Diluted Alcohol *a sufficient quantity;* Oil of Cloves *forty minims;* Hoffman's Anodyne *one fluidrachm and a half.* Mix the Senna and Jalap together, and add a sufficient quantity of Alcohol to thoroughly moisten them, and let the mixture stand for twenty-four hours; then transfer it to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, six fluidounces; evaporate the remaining Alcoholic tincture that comes through to six fluidounces, and likewise set it aside. Then add a sufficient quantity of Diluted Alcohol to the residuum in the percolator, until the liquid passes but very little impregnated with the properties of the medicines; evaporate this latter solution to twelve fluidounces, then add the Sugar, and continue the evaporation until the syrup is reduced to twelve fluidounces, and while warm add the Carbonate of Potassa, the Oil of Cloves previously dissolved in Hoffman's Anodyne, also the reserved Tincture and Extract, and make one pint and a half of Fluid Extract.

Properties and Uses.—This is a concentrated form of the Compound

Powder of Jalap, and may be given with safety in all cases where a purgative is required. Should any resinous matter be deposited, it must be dissolved in alcohol and combined with the extract; the addition of the carbonate of potassa is to enable the resinous matter deposited during evaporation, to be dissolved, also to aid in counteracting the griping property of the medicine. The dose for an adult is a fluidrachm, which is about equivalent to one drachm of the powder.—*W. S. M.*

EXTRACTUM SENNÆ ET RHEI FLUIDUM. *Fluid Extract of Senna and Rhubarb.*

Preparation.—Take of Senna, in coarse powder, *twelve ounces* (Troy); Rhubarb, in coarse powder, *four ounces;* Bicarbonate of Potassa *half an ounce;* Sugar *eight ounces;* Tincture of Ginger *a fluidounce;* Oil of Cloves *eight minims;* Oil of Anise *sixteen minims;* Alcohol, and Water, of each, *a sufficient quantity.* Mix the Senna and Rhubarb together, pour upon them two pints of Diluted Alcohol, and allow them to macerate for twenty-four hours; then introduce the mixture into a percolator furnished below with a stop-cock or cork to regulate the flow. A mixture of one part of Alcohol and three of Water should now be gradually added, so as to keep a constant but slow displacement of the absorbed menstruum, until one gallon of tincture has passed. Evaporate this in a water-bath to eleven fluidounces, dissolve in it the Sugar and Bicarbonate of Potassa, and after straining, add the Tincture of Ginger holding the Oils in solution, and mix. When finished the whole should measure a pint.

History.—If the percolation has been properly conducted, the ingredients will have been sufficiently exhausted when six pints of fluid have passed. As by far the larger portion of the soluble matter passes in the first two pints, it is well to set these aside and evaporate them separately to six fluidounces, subsequently adding it to the other liquid when it has been reduced to five fluidounces. As the cathartic principles of senna and rhubarb are very susceptible to injury from heat, especially in contact with the air, the propriety of using the best available means for conducting the evaporation need not be urged. When the evaporation is conducted in open vessels, some advantage is gained by adding the sugar to the tincture and continuing the process until it measures fifteen fluidounces. The sugar protects the extractive matter from oxidation, and more completely suspends or dissolves the resinous part of the rhubarb contained in the tincture. The bicarbonate of potassa should not be added to the extract while it is above 140° F., and should be reduced to powder previously.

Properties and Uses.—Senna has little, if any, tonic influence on the alimentary surfaces; an overdose has a depleting effect, often inconvenient, and its exhibition is frequently attended with griping. Rhubarb, on the other hand, possesses both a purgative and astringent property, the latter coming into play *after* the former has manifested itself, and thus repairing, as it were, its effects. The astringent or tonic action of rhubarb is so strongly marked, that, in most cases, when a simple cathartic is needed, it becomes necessary to combine this drug with some other cathartic to overcome or modify this peculiarity. By the union of senna and rhubarb in the concentrated form presented by a fluid extract, and in a due proportion, a resulting cathartic is obtained which is safe, unattended by unpleasant symptoms, and not followed by constipation when the dose has been properly graduated. The association of alkalies and alkaline salts with rhubarb and senna, has a tendency to prevent their griping, and in the case of senna, to increase its activity. The dose of this fluid extract, for an adult, is from half a fluidrachm to a fluidrachm.—*Wm. Procter, Jr.*

EXTRACTUM SERPENTARIÆ FLUIDUM. *Fluid Extract of Virginia Snakeroot.*

Preparation.—Take of Virginia Snakeroot, in coarse powder, *twelve ounces;* Alcohol and Water, of each, *a sufficient quantity.* Mix the Serpentaria with twelve ounces of Alcohol, and allow it to stand for twenty-four hours; then transfer it to a percolator and gradually add Alcohol until a pint and a half of filtered liquor is obtained. Place this in an evaporating dish, and allow it to evaporate spontaneously until reduced to six fluidounces. To the root in the percolator, exhausted by alcohol, add gradually a sufficient quantity of Water, until it is exhausted, or until about three pints have passed (to which, if required, Sugar *six ounces* may be added and dissolved). Evaporate this last aqueous solution in a water-bath, to six fluidounces, and while warm, add the six fluidounces obtained by spontaneous evaporation of the alcoholic tincture, mix together, and strain.

Properties and Uses.—This fluid extract forms a useful tonic, which may be used in cases where the root is admissible. Each ounce of it represents an ounce of the root. The dose is from fifteen to forty-five minims, three or four times a day.—*A. B. Taylor.*

EXTRACTUM SPIGELIÆ ET SENNÆ FLUIDUM. *Fluid Extract of Spigelia and Senna.*

Preparation.—Take of coarsely powdered Pink Root *sixteen ounces* (Avoir.); Senna, in coarse powder, *eight ounces;* White Sugar *twenty-four ounces;* Carbonate of Potassa *one ounce;* Oil of Caraway, Oil of Anise, each, *half a drachm;* Diluted Alcohol *a sufficient quantity.* Mix the Pink Root and Senna with *two pints* of Diluted Alcohol, and macerate for forty-eight hours. Then introduce them into a displacement apparatus, and gradually add more Diluted Alcohol until five pints have passed. Evaporate this in a water-bath to twenty fluidounces, and add the Carbonate of Potassa, which prevents any resinous substance from being precipitated, and also modifies the griping action of the Senna. Triturate the Oils with a portion of the Sugar, then with the whole of it, add this to the evaporated liquid, and dissolve the Sugar by a gentle heat. The whole should measure two pints.—*W. Procter, jr.*

Properties and Uses.—This fluid extract is quite a pleasant medicine possessing both cathartic and anthelmintic properties. An adult may take half a fluidounce or an ordinary tablespoonful for a dose; and a child two to four years old, a fluidrachm or a teaspoonful.

EXTRACTUM STILLINGIÆ FLUIDUM. *Fluid Extract of Queen's Root. Bronchial Elixir.*

Preparation.—Take of the recently gathered Root of Stillingia, cut into small pieces, *one pound;* Alcohol, 76 per cent., *four pints;* White Sugar *eight ounces;* Oil of Caraway *a fluidrachm;* Water *a sufficient quantity.* Cover the Root with Alcohol, and let the mixture stand for twenty-four hours; then transfer it to a percolator, so packed as to admit of a slow running, and add gradually the remainder of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running, four fluidounces; evaporate the remainder of the Alcoholic tincture that comes through to four fluidounces, and likewise set it aside. Then pour Hot Water on the residuum in the percolator, until the liquid that comes through is but slightly impregnated with the properties of the Stillingia; evaporate this solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved tincture and extract, and then the Oil of Caraway, and make one pint of Fluid Extract.

Properties and Uses.—This fluid extract possesses all the active properties of the Queen's Root, in a concentrated form, one fluidrachm being equal to one drachm of the root. On account of its great activity it is never used in scrofula, syphilis, etc., in which the more agreeable and sufficiently active and efficacious compound syrup of stillingia is preferred. It has been, however, found very efficient in bronchitis, laryngitis, and various pulmonary affections. The dose is from two to five or ten drops, to be placed upon the tongue, and allowed to pass very slowly into the stomach—*W. S. M.*

EXTRACTUM TARAXACI FLUIDUM. *Fluid Extract of Dandelion.*

Preparation.—Take of the recently-dried Root of Dandelion, in coarse powder, *four pounds;* Alcohol *twelve fluidounces;* Sugar *two pounds;* Water *a sufficient quantity.* Moisten the root with Cold Water, and let it stand for twenty-four hours; then express, filter, add the Alcohol, and set the liquid aside. Break up the cake produced by the pressure, cover it with Cold Water, and let it stand twenty-four hours; again express, filter, and add the Sugar to the liquid. Evaporate in shallow vessels by means of a water-bath, to a quantity that shall just make forty-eight fluidounces on the addition of the first reserved solution, and mix the two liquors.

History.—Dandelion is very much injured in its medicinal properties by heat, hence the importance of employing as little heat in making the above fluid extract as possible. Mr. Wm. Procter, jr., offers the following mode of obtaining the virtues of dandelion, by which the natural juice may be preserved unimpaired: Take of fresh Dandelion Roots (collected in September or October), *twenty pounds*, Avoirdupois; alcohol, sp. gr.

0.835, *four pints*. Slice the roots transversely in short sections, and by means of a mill or mortar and pestle reduce them to a pulpy mass; then add the alcohol and mix them thoroughly. The mixture thus far prepared at the season when the root is proper for collection, may be set aside in suitable vessels; stoneware jars are appropriate; and extracted as the preparation is needed through the other seasons. After having stood a week, or until a convenient time, the pulpy mass is subjected to powerful pressure, until as much as possible of the fluid is removed. This is then filtered and bottled for use. It is necessary that sufficient time should elapse after the pulp is set aside, for the alcohol to penetrate the fibrous particles and commingle with the natural juices, as well as for the woody structure of the root to lose its elasticity, that it may yield the juice more completely on pressure. When the pulp has stood six months in this manner it yields the juice with great readiness, and is possessed of the sensible properties of the dandelion in a marked degree. When eight pounds, Avoirdupois, of the root is thus treated, after standing several months, the practical result is about six pints of fluid, with an ordinary screw-press. This yield will vary in amount with the condition of the root when collected, and the length of time it is exposed afterward, as well as the power of the press used. Should the alcohol in this preparation be contra-indicated, it might be partially removed by exposure in a water-bath until the juice was reduced to five-sixths of its bulk, and then for every pint of the residue, eight ounces, Troy, of sugar may be added and dissolved in it.

Properties and Uses.—Fluid Extract of Dandelion may be administered in all cases when the influence of this drug upon the system is desired. The dose is one or two fluidrachms three times a day. Some practitioners speak very highly of the therapeutical influence of dandelion; others, myself among the number, do not; probably, in the latter instances, the cause may exist in using preparations rendered inert by the heat employed in their manufacture.

EXTRACTUM UVÆ URSI FLUIDUM. *Fluid Extract of Uva Ursi.*

Preparation.—Macerate Uva Ursi, in coarse powder, *eight ounces*, Troy, in a mixture of *one part* of Alcohol and *four parts* of Water, for twenty-four hours, and then displace slowly with the same menstruum until two pints have passed. Add White Sugar *eight ounces*, and evaporate in a water-bath to ten fluidounces.

Properties and Uses.—This may be used wherever Uva Ursi is indicated, in doses of a fluidrachm. It has been found very useful in irritable conditions of the bladder, associated with three to five fluidounces of the fluid extract of lupulin.

EXTRACTUM VALERIANÆ FLUIDUM. *Fluid Extract of Valerian.*

Preparation.—Take of coarsely powdered Valerian Root *eight ounces* (Troy); Ether *four fluidounces;* Alcohol *twelve fluidounces;* Dilute Alcohol *a sufficient quantity*. Introduce the Valerian, uniformly and without pressure, into a displacement apparatus. Mix the Ether and Alcohol, and allow the mixture to percolate slowly and regularly through the powder until all has been added. The Diluted Alcohol is then poured on until the ethereal menstruum has been displaced, which is known by the product amounting to nearly a pint. More Diluted Alcohol is now poured on until ten fluidounces more of liquid passes, when the operation is stopped. The pint of ethereal tincture is placed in a shallow vessel, and suffered to evaporate spontaneously till reduced to six fluidounces. The clear liquid is then poured off and mixed with the ten fluidounces of tincture, and the oleo-resin adhering to the sides of the dish is dissolved in a little Alcohol and added to the rest. The mixing of the liquids, by changing the strength of the menstruum, causes the separation of a little resin and oil and a little extractive; and it is requisite that the mixture should stand, with occasional agitation, for three or four hours before being filtered, after which it should measure a pint.

It is a dark-brown transparent liquid, having a strong taste and odor of Valerian, and an acid reaction. One fluidounce represents half a Troy ounce of the root.— *W. Procter, Jr.*

Properties and Uses.—This holds the virtues of Valerian in a concentrated state, and may be used when desired to obtain the influence of that agent. It may also be combined with various other fluid extracts, as of cimicifuga, cypripedium, senecio, etc. The dose is one or two fluidrachms, three times a day, or oftener, if required.

EXTRACTUM VANILLÆ FLUIDUM. *Fluid Extract of Vanilla.*

Preparation.—Take of choice Vanilla *an ounce* (Troy); Sugar *fourteen ounces* (Troy); Deodorized Alcohol, *four fluidounces;* Diluted Alcohol, Water, each, *a sufficient quantity.* Cut the Vanilla in short transverse slices, beat it to a pulp with two ounces of the Sugar and a little Alcohol, put the mixture in a small percolator, and pour gradually on first the Alcohol, and afterward Diluted Alcohol, till twelve fluidounces of tincture are obtained. Add two ounces of Sugar to this tincture, evaporate it at 120° F., till reduced to six fluidounces; then add the remainder of the Sugar and five ounces of Water, or as much as is sufficient to make a pint of fluid extract.

Properties and Uses.—This extract embodies all the aroma of the beans, and is well adapted for both pharmaceutical and culinary uses. Two fluidounces added to two pints of simple syrup, form an excellent *Syrup of Vanilla*, or if a perfectly transparent syrup be desired, two ounces of the fluid extract may be triturated with two drachms of Carbonate of Magnesia, to which half a pint of Water may be added gradually; then filter, mix the liquid with another half-pint of water, add two and a half pounds (Troy) of Sugar, dissolve with gentle heat, and strain.— *Wm. Procter, Jr.*

EXTRACTUM XANTHOXYLI FLUIDUM. *Fluid Extract of Prickly Ash.*

Preparation.—Take of Prickly-Ash Bark, in coarse powder, *one pound*; Alcohol, 76 per cent., *four pints;* White Sugar *four ounces;* Diluted Alcohol *a sufficient quantity.* Moisten the bark thoroughly with Alcohol, and let it stand twenty-four hours; then transfer the mixture to a percolator, and gradually add the rest of the Alcohol, returning a little of the first that passes, till it runs clear. Reserve, by itself, of the first running four fluidounces; evaporate the remaining alcoholic tincture that comes through to four fluidounces, and likewise set it aside. Then add a sufficient quantity of Diluted Alcohol to the residuum in the percolator, until the liquid that comes through has very little of the taste of the medicine; evaporate this latter solution to half a pint, then add the Sugar, continue the evaporation until the syrup is reduced to eight fluidounces, and while warm, mix in the reserved Tincture and Extract, and make one pint of Fluid Extract.

Properties and Uses.—Fluid Extract of Prickly-Ash Bark is a stimulant, tonic, alterative, and sialogogue, and may be used in all cases where the bark is indicated, or desired. The dose is from ten to thirty minims, three times a day.—*J. K.*

FERRUM.

Preparations of Iron.

FERRI ACETAS. *Acetate of Iron.*

Preparation.—Take of Carbonate of Iron *one ounce;* Acetic Acid *six ounces;* digest for three days, and filter.

History.—This solution has a deep-red color, and an acid and strongly chalybeate taste. It is *incompatible* with alkalies and their carbonates, the strong acids, and vegetable astringent infusions.

Properties and Uses.—Tonic and astringent, and possesses the general medical properties of the preparations of iron. A diluted solution of it, with a few drops of creasote, will be found a valuable injection in leucorrhea. Dose, five to twenty drops, in water. (*See Tinctura Ferri Acetatis.*)

FERRI CARBONAS SACCHARATUM. *Saccharine Carbonate of Iron.*

Preparation.—Take of Sulphate of Iron *four ounces;* Carbonate of Soda *four ounces and a quarter;* Sugar *two ounces;* Boiling Distilled Water *four pints*, Imperial measure. Dissolve separately the Sulphate of Iron and Carbonate of Soda, each in two pints of the Water. Mix the solutions while still hot, and set the mixture aside, that the Carbonate of Iron may subside. Then, having poured off the supernatant liquor, wash frequently the precipitated Carbonate. To this add the Sugar, dissolved in *two fluidounces* of Water, and evaporate the mixture by means of a water-bath until the powder is dry. Keep this in a well-stopped bottle.—*Lond.*

History.—Protosulphate of iron and carbonate of soda, in solution, exchange acids, the carbonate of iron being precipitated of a greenish-white color, the sulphate of soda remaining in solution. This precipitate rapidly absorbs oxygen from the air, becoming brown, and parting with its carbonic acid forms a hydrated oxide of iron. But when sugar is added to the moist carbonate of iron it immediately abstracts its water, and at the same time the mass acquires a deep green color, becomes deliquescent, and the carbonate of iron having a protecting covering of sugar undergoes no further change during the evaporation to dryness. The real use of the sugar is to prevent the oxidizing action of the air on the protoxide of iron, and by this means the carbonic acid is retained in combination with the latter. The sugar may possibly in this case exert an opposing action to the formation of peroxide, as it possesses the property of reducing peroxide of copper to protoxide, although it has not the power of converting any of the peroxide, already present, to protoxide.—*Witt.*

Saccharine Carbonate of Iron is a permanent greenish, or brownish-gray powder, odorless, with a sweet, and somewhat ferruginous taste. Cold water dissolves the sugar and a small quantity of iron, and if the solution be heated, it becomes yellow and turbid from the separation of hydrated peroxide of iron, with evolution of carbonic acid. With hydrochloric acid it strongly effervesces. 100 parts correspond to about 45 parts dry carbonate of iron.

Properties and Uses.—This is a useful chalybeate tonic, superior to the protocarbonate of iron, but not equal to Vallet's pills of carbonate of iron in which the metal is more completely protected from oxidation. (*See Pilulæ Ferri Carbonatis*). The dose is from five to twenty grains, in pill; it renders the stools greenish-black.

FERRI CITRAS. *Citrate of Iron.*

Preparation.—Take of moist Hydrated Sesquioxide of Iron *eight ounces;* crystallized Citric Acid *four ounces;* Distilled Water *sixteen fluid-ounces.* Dissolve the Citric Acid in the Distilled Water, heat to near the boiling point, and add the Hydrated Sesquioxide of Iron, adding rather more than the acid will dissolve. When cold, filter, evaporate by a water-bath to a syrupy consistence, spread out on earthenware dishes or glass plates, and dry with a gentle heat until it separates in scales.

Duhamel recommends three parts of Citric Acid, in crystals, two parts of dry Hydrated Oxide of Iron, and twelve parts of Distilled Water at 180° F., proceeding as in the above formula.

History.—This is a percitrate of the sesquioxide of iron, $Fe_2\,O_3\,\overline{Ci}\,2HO=263$? If a greater heat than that directed were to be used the sesquioxide of iron would have its solubility lessened. Citrate of Iron is in brownish-red scales, not readily dissolving in cold water, but quickly in boiling, reddens litmus-paper, and has a not unpleasant ferruginous taste.

A preperation called Ammonio-Citrate of Iron, or Ferric Citrate of Ammonia, *Ferri Ammoniæ Citras*, or *Ammoniæ Ferrico-Citras* (*P.*) is made as follows:—Take of crystallized Citric Acid *four ounces;* Clean Iron Filings, or small Iron Nails *two ounces;* Distilled Water, Solution of Ammonia, each, *a sufficient quantity.* Dissolve the citric acid in twenty times its weight of water in a Wedgewood dish, add the iron, and apply a gentle eat until effervescence ceases, and no more iron is dissolved, renewing the water from time to time as it evaporates; filter the solution, and add solution of ammonia until it is slightly in excess; evaporate by the heat of a water-bath until it acquires a syrupy consistence; then spread it out in thin layers on earthenware dishes, and dry it with a gentle heat. When dry it will separate from the dishes in scales.—(*Redwood*, *from P.*) It is in thin, shiny, beautiful hyacinth-red scales, of a sweetish and astringent taste, neutral, readily soluble in water, and not made blue by ferrocyanide of potassium.

Properties and Uses.—These salts are pleasant ferruginous tonics, and may be given to children in ordinary cases of debility, struma, etc. The dose of either is from four to ten grains in pill, or in water flavored with orange peel, syrup, etc. The citrate is best given in the form of pill.

FERRI ET QUINIÆ CITRAS. *Citrate of Iron and Quinia.*

Preparation.—Take of Citrate of Iron *five ounces;* recently precipitated Quinia *one ounce;* Citric Acid *two drachms;* Distilled Water *twelve fluidounces.* Mix these together in a glass or porcelain vessel, and apply heat, but not sufficient to produce boiling; stir constantly. When the articles are all dissolved, carefully concentrate to a honey-consistence, and dry it on glass in the same manner as the Ferro-Tartrate of Morphia.—*Wm. Procter*, *jr.*

History.—Citrate of Iron and Quinia thus made is in glossy, dark reddish-brown scales, soluble in water. It may also be made in the following manner: Dissolve Citrate of Iron *four parts*, Citrate of Quinia *one part*, in Distilled Water, and evaporate the solution to dryness, as directed for Citrate of Iron.—*Beral.*

Properties and Uses.—A valuable tonic. Dose, five to ten grains, in solution, or pill, repeated three time a day.

FERRI ET MORPHIÆ TARTRAS. *Ferrotartrate of Morphia. Tartrate of Iron and Morphia.*

Preparation.—Take of Crystallized Tartaric Acid, Distilled Water, each, by weight, *two ounces;* moist Hydrated Sesquioxide of Iron, pure Morphia, of each, *a sufficient quantity.* Boil the Tartaric Acid and the Distilled Water together, in a glass or platina vessel; as soon as the Acid is dissolved, add the Iron until the fluid will dissolve no more. Heat the mixture until the deep blood-red fluid becomes clear, and then add the Morphia until the fluid ceases to dissolve it. Evaporate the solution by means of gentle heat, to the consistence of thick syrup, and spread it in thin layers on glass, to dry.—*Prof. J. M. Sanders.*

History.—This preparation forms in pellicles of a deep crimson color, and belongs to that class of non-crystallizable or factitious salts, as the Ferro-citrate of Iron and Quinia, so popular with the medical profession for the last eight or ten years; on account of its ready solubility and promptness of action, it has been considerably used by physicians. It is *incompatible* with astringent vegetable infusions, strong acids, alkalies, and their carbonates.

Properties and Uses.—This salt is an active and efficient tonic and sedative, and may be employed in all cases of debility, chlorosis, anemia, etc., connected with an irritable or excitable condition of the system. In the intermission or remission of fevers, it may be used with much advantage, assisting materially in lessening the severity of the subsequent febrile exacerbations, or breaking them up entirely. The dose for an adult is from half a grain to a grain every two or three hours, or until its sedative influence is fully obtained.

FERRI ET QUINIÆ TARTRAS. *Ferrotartrate of Quinia. Tartrate of Iron and Quinia.*

Preparation.—Take of Crystallized Tartaric Acid, Distilled Water, each, by weight, *two ounces;* moist Hydrated Sesquioxide of Iron, pure Quinia, of each, *a sufficient quantity.* Boil the Tartaric Acid and the Distilled Water together, in a glass or platina vessel; as soon as the Acid is dissolved, add the Iron as long as the fluid will dissolve it. Heat the mixture until the deep blood-red fluid becomes clear, and then add the Quinia until the fluid ceases to dissolve it. Evaporate the solution by means of gentle heat, to the consistence of thick syrup, and spread it in thin layers on glass, to dry.—*Prof. J. M. Sanders.*

History. — This salt is much more soluble than the citrate of iron and quinia. It forms into scales of a beautiful crimson color. It is *incompatible* with astringent vegetable infusions, strong acids, alkalies, and their carbonates.

Properties and Uses.—The Ferrotartrate of Quinia is a valuable tonic, and may be used with benefit in chlorosis, amenorrhea, debility, anemia, and during the remissions or intermissions from fever; also in scrofula, and wherever the union of quinia with a chalybeate is indicated. The dose is from three to five grains, three times a day, either in solution or in the form of pill.

FERRI ET SALICINIÆ TARTRAS. *Ferrotartrate of Salicin. Tartrate of Iron and Salicin.*

Preparation.—Take of Crystallized Tartaric Acid, Distilled Water, each, by weight, *two ounces;* moist Hydrated Sesquioxide of Iron, pure Salicin, of each, *a sufficient quantity.* Boil the Tartaric Acid and the Distilled Water together in a glass or platina vessel; as soon as the Acid is dissolved, add the Iron as long as the fluid will dissolve it. Heat the mixture until the deep blood-red fluid becomes clear, and then add the Salicin until the fluid ceases to dissolve it. Evaporate the solution by means of gentle heat, to the consistence of thick syrup, and spread it in thin layers on glass, to dry.—*Prof. J. M. Sanders.*

History.—Although Salicin appears to be a neutral substance, still, prepared according to the above process, it enters into combination with the other agents, forming a compound which possesses the active virtues of the Salicin in a remarkable degree. It is *incompatible* with astringent vegetable infusions, strong acids, alkalies, and their carbonates.

Properties and Uses.—Similar to those of the Ferrotartrate of Quinia. In the hands of several physicians of the South, this preparation has been found equal to the analogous one of Quinia in intermittent fevers. The dose is from three to ten grains, three times a day, either in solution or in form of pill.

FERRI FERROCYANURETUM. *Ferrocyanuret of Iron. Pure Prussian Blue. Prussiate of Iron.*

Preparation.—This is formed by precipitating a solution of Ferrocyanuret of Potassium with Sulphate of the Sesquioxide of Iron, acidulated with Sulphuric Acid, and washing the blue precipitate with very weak Sulphuric Acid. The following is a good formula for its preparation on a small scale: Dissolve Sulphate of Iron *two ounces*, in Water *half a pint*, add Sulphuric Acid *one fluidrachm and forty-five minims*, and then boil. Now add in small quantities at a time, Nitric Acid, boiling the mixture each time after it has been added, two or three minutes, and continue dropping in the Nitric Acid until it ceases to give a dark color to the liquid, and set it aside to cool. In the mean time add Ferrocyanuret of Potassium *two ounces and two drachms* to another *half pint* of Water, and when the solution is effected, add it carefully, in small quantities at a time, to the cold solution of Iron, prepared as above named, shaking the mixture each time after adding it. Remove the fluid by filtration; wash the blue precipitate in several waters at 212° F., till they no longer have any taste, and then dry it.

The Prussian Blue of commerce is obtained by fusing animal matters with carbonate of potassa so as to form cyanide of potassium, and treating the solution of the product with alum and green vitriol. The greenish precipitate thus produced acquires a lively blue tint under exposure to the air. It may be rendered very pure, by digestion in sulphuric acid considerably diluted.—*C.*

History.—If iron be precipitated from a solution which has been entirely converted into a persalt, the precipitate will contain no protoxide. For this purpose the sulphate of iron is previously treated with nitric acid. The latter gives up three equivalents of its oxygen, which uniting with six equivalents of protoxide, forms the sesquioxide. To form a soluble neutral sulphate of the sesquioxide of iron, three equivalents of sesquioxide of iron require nine equivalents of sulphuric acid, consequently three equivalents of sulphuric acid must be added to six of protosulphate of iron. The nitric oxide, NO_2 to which the nitric acid is thus reduced, when in contact with the air again combines with two equivalents of oxygen, and appears as brownish yellow vapors NO_4. The whole of the protoxide in the sulphate of iron can be converted into sesquioxide without the additional sulphuric acid, but the process is more expensive, the sulphuric acid keeps the sulphate soluble, preventing any precipitate. The ferrocyanuret of potassium occasions a decomposition, in which three equivalents of ferrocyanuret $Cfy_3\,K_6 = 3Cfy\,K_2$ are required for two equivalents of the sulphate of sesquioxide of iron, or $2Fe_2O_3\,3SO_3$. The result is Prussian Blue. Chemists are not agreed as to the precise nature of Prussian Blue; Berzelius gives its formula as $3Fe\,Cy+2Fe_2\,Cy_3=Fe_7\,Cy_9$. Its equivalent weight is 430. Ferrocyanogen, according to Liebig, is a bibasic radical, $Cy_3\,Fe=Cfy=105.87$.

During the decomposition of animal matters by heat, cyanogen is generated; as when blood and carbonate of potassa are calcined in an iron pot; and it is from animal matters, in this way, that Prussian Blue is made in large quantities. Cyanogen has been detected, in combination with iron, in the urine, perspiration, and menstrual fluid; and in combination with sulphur and potassium in the saliva. Prussian Blue has been found in the greenish-blue discharge of some ulcers.

Prussian Blue, when well made, is of a beautiful dark-blue color, without taste or odor, and is not dissolved by water, alcohol, ether, oils, or dilute acids. It is decomposed by the concentrated acids, with a variety of phenomena. The alkalies also decompose it, forming ferrocyanates. Heated in the air, it burns slowly, leaving sesquioxide of iron, and earthy matters if present. Oxalic and other organic acids dissolve it, forming a beautiful deep-blue solution. When Prussian Blue is boiled with diluted muriatic acid, filtered, and ammonia added to it, no precipitate takes place if the drug be pure—should one ensue, however, the article is impure.

Properties and Uses.—Prussian Blue is tonic, sedative, and febrifuge; and was introduced as a remedy in periodic diseases, in conjunction with sulphate of quinia, by the late Prof. I. G. Jones, who used it with great success in the treatment of these diseases. He did not regard the febrile or inflammatory symptoms as contraindicating its use, provided the disease was, in the least degree, of a periodical character. It is now successfully used in intermittent, congestive, bilious, and typhoid fevers, especially during the remissions, and also in typhoid pneumonia; the dose is three or four grains, combined with the same quantity of sulphate of quinia, and which is to be repeated every three, four, or five hours, according to the nature of the case. Prussian Blue, or as more commonly called among physicians, Prussiate of Iron, has likewise been successfully used in diarrhea, summer complaint of children, pertussis, dyspepsia, epilepsy, hysteria, chorea, and facial neuralgia. The dose is usually from one to five grains, three times a day,

FERRI IODIDUM. *Iodide of Iron.*

Preparation.—Take of Iodine *two ounces and two drachms;* Pure Iron Filings *six drachms;* Distilled Water, cold, *four fluidounces and a half.* Place these articles in a Florence flask, boil till the liquid loses its dark color, then filter it rapidly into another clean flask, and, without delay, place the flask over the flame of a spirit-lamp or gas-burner, and evaporate the liquid at a boiling heat. The ebullition may be allowed to proceed with very little attention for a considerable period, but when the liquid passes from a green shade into black, close attention becomes necessary, as the process now approaches very near to its close.

The iodide may now be obtained either as a crystallized hydrate, or in an amorphous anhydrous form, by the following processes: 1st, as a *crystallized hydrate*, by dipping an iron wire or glass rod into the liquid in the flask at short intervals, till, on removing and cooling, the iodide is found to form a dry and hard crust on the rod. When the evaporation has reached this point, remove the flask from the fire, and the fused iodide crystallizes on cooling.

2. As an *anhydrous iodide;* the evaporation must be carried still further. The period for bringing the application of heat to a close, can very readily be judged of by occasionally placing a piece of cold glass over the mouth of the flask, and removing the heat when moisture ceases to be condensed on the glass. A pure, anhydrous, spongy protiodide will then be found in the flask. As during the whole operation the flask is filled with a body of steam continually given off by the liquid, the atmospheric air is excluded to the last, and no free iodine is given off during the whole process. The iodide may be removed by breaking the flask; and the compound should, without the least delay, be coarsely bruised in a warm dry mortar, and then placed in small bottles and well corked.—*T. and H. Smith.*

On the old plan the iodine was mixed with the water, and the iron filings gradually added, with constant stirring of the mixture. This was then heated until it acquired a greenish hue, filtered, and evaporated to dryness in an iron vessel.

History.—The iodine combines with the iron to form protiodide; the only part the water plays is to facilitate the process. It is necessary for the combination that one of them first assumes the fluid state, and it happens thus;—at first a little iodine dissolves in the water, and *then* combines with a portion of the iron, forming a solution of protiodide of iron, which is capable of dissolving more iodine than pure water, and thus acquires a greater power of acting on the iron than at first, and this continues until all the iodine is taken up by the iron. One equivalent of iodine=1586 parts, requires one equivalent of iron=350 parts, but it is always better to have iron in excess. The above observations are by Wittstein, who is speaking of the old process of manufacturing this compound, referred to above, and he continues in his remarks:—"The iron must not be added at once, or the heat will be raised so much as either to break the glass or cause the fluid to boil over. The evaporation of the solution in an iron vessel is to prevent as much as possible the formation of sesquioxide, and sesqui-iodide of iron, which under these circumstances is but slight. The oxygen of the air will, of course, act on the surface of the liquid, oxidizing a portion of the iron, the iodine thus separated uniting with another portion of the iodide to sesqui-iodide; from this cause the solution during the evaporation acquires a trace of brown color. The evaporation is recommended by some to be carried on, until a portion of the solution dropped on a piece of cold porcelain solidifies, because, when carried to dryness, the mass left is apt to consist of protiodide, sesquiodide, and sesquioxide of iron."

Iodide of Iron is a dry greenish-gray, or greenish-black crystalline mass, odorless, and of a sweetish, astringent taste somewhat resembling iodine. Water or alcohol form with it, when freshly made, a greenish solution, having an acid reaction; in the air, on being kept, it deliquesces, forming sesquioxide and sesquiodide of iron, and will not be wholly soluble, forming a yellow or brown solution. Gently warmed it melts, and by a further action of heat, water, and air, continually evolves iodine vapors, and leaves a grayish-brown mass, consisting of protiodide, sesquiodide, and sesquioxide of iron. If the dried mass be heated to redness, all the iodine is given off, and the iron remains as oxide. In order to prevent the solution of the protiodide of iron from giving off free iodine, or being converted into sesquiodide of iron, even when exposed to air and light, a coil of iron wire should be kept in the solution. Mr. Phillips, jr., has suggested that, by the mutual action of iodide of iron and water, hydriodic acid and protoxide of iron are formed; the iron being acted upon by the oxygen of the atmosphere speedily becomes sesquioxide; while the hydriodic acid becoming oxidized under the joint influence of air and light, yields water and free iodine; and which is the cause of the acidity which is observed in the solutions as soon as sesquioxide is formed. The anhydrous salt consists of one atom of iodine 126.3, and one of iron, $28=154.3$; its formula is $Fe\,I$. The crystallized salt contains in addition five atoms of water $Fe\,I+5\,HO=199.3$. It is *incompatible* with vegetable astringents, soda, potassa, and other alkalies, liquor calcis, metallic salts, etc.

Properties and Uses.—The influence of Iodide of Iron upon the system, resembles that caused by the ferruginous salts, more than that occasioned by iodine. As a tonic it improves the appetite, invigorates the digestive organs, and blackens the alvine evacuations, diminishing their offensive odor. Sometimes it acts as a laxative, but more generally as a diuretic. It has been efficaciously used in scrofula, chlorosis, secondary syphilis, amenorrhea, chronic rheumatism, chronic cutaneous diseases, fluor-albus, asthenic dropsy, old visceral engorgements, atonic dyspepsia, and in all cases where there is torpor in the system of nutrition, where there is paucity of red globules in the blood, and the fluid is too thin. On account of its tendency to decomposition when exposed to the air, it should always be given in solution. (*See Liquor Ferri Iodidi.*) Iodide of Iron has, however, been given in pill form, being protected from deleterious agencies by the addition of gum and sugar, or tragacanth and honey. (*See Am. Jour. Pharm. XV.*, 71, and *CIII.*, 138.) The Liquor Ferri Iodidi, evaporated to a proper consistence for making pills, would probably form a better mode of administering this salt in a solid state, than when made by the above process. (*See Pilulæ Ferri Iodidi.*) The dose of Iodide of Iron is three grains, three times a day, gradually increased to eight or ten grains.

Of late, considerable use is being made of Dr. Dupasquier's *paste*, or pills of proto-iodide of iron; it is prepared as follows: Take of Iodine 121 grains; Iron 242 grains; Distilled Water 378 grains. Introduce the whole into a small matrass, which hold plunged during eight or ten minutes in water heated to about 167° F., so that no portion of the Iodine shall be volatilized. Agitate the mixture frequently. At first the liquid becomes brown, but soon gets perfectly colorless, or, at most, retains a nearly imperceptible green hue. (This preparation ought always to be extemporaneous, for it would be in vain to attempt to preserve it unaltered for an hour, even in ground stoppered bottles, and although metallic iron were present, owing to the decomposition of water.)

Filter the above solution, and pour the solution into an untinned iron vessel; add Pure Honey 302 grains; evaporate rapidly, until a great part of the original water be dissipated, and a syrupy consistence be attained; then add at intervals, continually agitating with an iron spatula, powder of Gum Tragacanth 184 grains. Form into a mass, and divide into 200 pills; each pill contains about three-quarters of a grain of Proto-iodide of Iron, and will remain a long time unaltered. *Blancard's Pills* are similar, but sugar coated as soon as made. M. Gille likewise prepares the above mixture in the form of sugar-plums. The paste is mixed with sugar, and then formed into plums or pills, and thickly coated over with sugar, in which state it may be kept permanent for years.

FERRI LACTAS. *Lactate of Protoxide of Iron. Lactate of Iron.*

Preparation.—Take of Lactate of Lime *twelve and a half ounces;* Pure Crystallized Sulphate of Protoxide of Iron *eight and a half ounces;* Boiling Water, Cold Distilled Water, of each, *sixty-two and a half ounces*, by weight; Lactic Acid *a sufficient quantity.* Dissolve the Lactate of Lime in the Boiling Water; also dissolve the Sulphate of Iron in the Cold Distilled Water; then filter each of these solutions, mix them in a vessel; feebly acidulate the mixture with Lactic Acid, and heat in a salt-water bath, constantly stirring it until the completion of the double decomposition. The Sulphate of Lime formed is to be removed by filtering, and the filtrate is to be quickly reduced to one-half by evaporation in an iron vessel (or, if porcelain be used, some iron filings must be added). Filter the concentrated liquid, and on cooling, it forms crystals of Lactate of Iron, which should be washed with Alcohol, and dried on bibulous paper.—*Lepage.*

History.—Lactic acid, according to the experiments of Bernard and Barreswil, exists in a number of the secretions of the human body, and especially in the gastric juice; it has therefore been supposed by medical men that as this acid in its action on the salts of iron taken into the stomach, may convert them into a lactate, this salt already formed might prove a valuable agent; hence the preparation of Lactate of Iron introduced to the profession by Gélis and Conté. When pure, lactate of iron is in colorless, acicular or prismatic crystals, which are not altered by exposure to the air, are nearly insoluble in water, soluble in forty-eight parts of cold, and twelve of boiling water, the solution reddening litmus-paper, and having a sweetish, mild chalybeate taste. When colored, it is impure. As it is liable to adulteration, it should always be purchased in the crystalline form, and in no other.

The Lactate of Lime used in the above process may be made as follows: Take of Skim-milk *half a gallon;* place it in a glass or earthen vessel, and add to it Water *one gallon;* Powdered Sugar of Milk *sixteen ounces;* Powdered Chalk *twelve ounces and six drachms.* Place this where it will be exposed to a heat between 75° to 95°, and permit the fermentation which ensues to continue for twelve or thirteen days, and as the water evaporates, add more to keep the quantity regular. Then remove the liquor to another vessel, expose it to a gentle heat, stirring all the time, and slowly raise it to the boiling point, which must be continued for fifteen minutes. On the subsidence of the casein and other matters, pass the supernatant fluid through a flannel bag, and on evaporation of the strained liquid to dryness, Lactate of Lime is obtained. The fermentation, which is due to the casein present, changes the lactin in the mixture into lactic acid, which, as fast as it forms, is taken up by the chalk, thereby converting its lime into a lactate.—*M. Gobley.*

Properties and Uses.—Lactate of Iron has been found efficacious in anemia, amenorrhea, dysmenorrhea, and other diseases in which the preparations of iron are usually of service. The dose is from one to three grains, gradually increased, and repeating it at periods of three or four hours. As it is not superior to other chalybeates, its costliness will probably prevent it from coming into general use.

FERRI OXIDUM HYDRATUM. *Hydrated Sesquioxide of Iron. Hydrated Peroxide of Iron. Hydrated Oxide of Iron.*

Preparation.—"Take of Sulphate of Iron *four ounces;* commercial Sulphuric Acid *three fluidrachms and a half;* Nitric Acid (D. 1.380) *nine fluidrachms;* Stronger Aqua Ammoniæ *three fluidounces and a half;* Water *two pints.*" (The above fluid measures are Imperial.) "Dissolve the Sulphate in the Water, add the Sulphuric Acid, and boil the solution; add then the Nitric Acid in small portions, boiling the liquid for a minute or two after each addition, until it acquires a yellowish-brown color, and yields a precipitate of the same color with ammonia. Filter; let the liquid cool; and add, in a full stream, the Aqua Ammoniæ, stirring the mixture briskly. Collect the precipitate on a calico filter; wash it with water till the washings cease to precipitate with nitrate of baryta; squeeze out the water as much as possible; and dry the precipitate at a temperature not above 180° F.

"When this preparation is kept as an antidote for poisoning with arsenic, it is preferable to preserve it in the moist state, after being simply squeezed."—*Ed.* It should be kept under water, in a stoppered bottle, when prepared moist as an antidote.

History.—As already observed, in speaking of the changes which occur in making Prussian blue, the oxygen of nitric acid converts the sulphate of protoxide of iron into the sulphate of sesquioxide. When caustic solution of ammonia (oxide of ammonium) is added to the sesquisulphate of iron thus made, it combines with the sulphuric acid of the latter to form a readily soluble salt; the sulphate of ammonia, which remains in the solution, and may be obtained from it, by evaporation, in the solid form. At the same time this change occurs with the sulphuric acid and ammonia, the sesquioxide of iron is precipitated in combination with three equivalents of water. The sesquioxide retains in combination with it some ammonia, which is removed by the washings with water. This oxide of iron, when employed as an antidote for arsenic, should be used in the moist state, to insure a speedy and certain action, and for this purpose it is kept as stated in the formula.

Hydrated Oxide of Iron, as prepared by the above process, is an amorphous powder, of a reddish-brown tint, odorless, tasteless, insoluble in water, but dissolving readily in hydrochloric acid forming a golden-yellow solution. Heated to redness, it loses its water, and then does not so readily render arsenious acid insoluble. If it effervesces with hydrochloric acid, this indicates the presence of carbonic acid; oxalate of ammonia will cause a precipitate if lime be present. If the solution in hydrochloric acid gives a blue precipitate with ferrocyanuret of potassium, it contains protoxide; if after dissolving it in hydrochloric acid there is a white gelatinous residue, soluble in potassa, it is silica, arising from its being made with a potassa containing silica instead of with ammonia. A solution of carbonate of ammonia strikes a blue color when oxide of copper is present; should the color not be perfectly evident, supersaturate with acetic acid, and add solution of ferrocyanuret of potassium, which causes a brownish-red precipitate if the smallest trace of copper be present. The terhydrated oxide of iron which exists in the moist mass loses, by long standing, the half of its chemically combined water, becoming crystallized instead of amorphous, is no longer soluble in acetic acid, and dissolves with difficulty in tartaric. It is, therefore, recommended, about every six months, that the hydrate, kept as an antidote to arsenic, be redissolved in hydrochloric acid, and precipitated with ammonia. The formula for this hydrated oxide is $Fe_2\,O_3+3\,HO$, with 25.20 per cent. of Water.—*Witt.* When used for poisoning by arsenic, the hydrated oxide of iron should "be in the form of a soft or gelatinous moist magma."—*P.*

Properties and Uses.—This preparation, as with other chalybeates, possesses tonic properties. But it is principally used in cases of poisoning by arsenic, in which it proves a valuable antidote. When this Hydrated Oxide of Iron is placed into an aqueous solution of arsenic, it removes the arsenious acid so thoroughly, forming an insoluble substance, that even sulphureted hydrogen will not indicate the presence of the poison. This insoluble substance is the subarseniate of protoxide of iron. The Hydrated Oxide of Iron in the moist state may be used freely in cases of poisoning by arsenic. Dr. Maclagan states that "at least twelve parts of oxide, prepared by ammonia, are required for each part of arsenic." Dr. T. R. Beck recommends it to be given every five or ten minutes, or as often as the patient can swallow it, until relief is obtained; adults may take a tablespoonful; children a dessertspoonful. Of course, the sooner it is given after the poison has been taken, the more prompt and efficacious will be its action. If Hydrated Oxide of Iron be not at hand, let the common red oxide of iron be given with water as a substitute; for though not equally efficacious with the Hydrated Oxide, it appears to possess some antidotal power. As a tonic, the dry hydrate may be employed in doses of from five to twenty grains.

In relation to this uniformly successful antidote to poisoning by arsenious acid, Prof. W. Procter, jr., has recently furnished a formula which is easily executed, and which furnishes a concentrated solution of the Tersesquisulphate of Iron of known strength, so that the operator can graduate the precise quantity of oxide by means of his measure glass. The formula, together with Prof. P.'s remarks, are given entire: Take of Proto-sulphate of Iron, well crystallized, *sixty-four ounces* Troy, Sulphuric Acid *seven fluidounces;* Nitric Acid, sp. gr. 1.38, *twelve fluidounces;* Water *a sufficient quantity.*

Reduce the Sulphate of Iron to moderately fine powder in an iron mortar, mix together the Acids and five fluidounces of Water, put the mixture in a large porcelain capsule on the sand-bath or other regular source of heat, and add the powdered Sulphate, about two ounces at a time, stirring after each addition, till the effervescence ceases, until all has been added, and the elimination of nitrous fumes has ceased. In the absence of a porcelain capsule and sand-bath, the operator may use a gallon glass jar, supported in a vessel of Boiling Water; in either case, the vessel should be large enough to allow for active effervescence, and it is hardly necessary to say that the operation should be performed under a chimney-hood, or in the open air, to avoid the noxious fumes of Nitrous Acid. The dense solution thus obtained should then be diluted with Water until it measures four and a half pints (wine measure), and then filtered through thick muslin.

Solution of Ter-sulphate of Iron thus prepared, has a dark, reddish-brown color in quantity, the specific gravity of 1.587 at 60° F., but little if any odor, a powerful styptic taste, and mixes readily with Water, so as to form a solution with more color in proportion to its dilution than the strong liquid. Each fluidounce of this solution contains a fraction more than 120 grains of Sesquioxide; each fluidrachm 15 grains, and each minim a quarter of a grain; and as it is equally applicable for preparing the

Oxide for chemical as for antidotal purposes, this correspondence of weights with measures gives great facility in calculating any precise quantity desired.

It is this solution which I have proposed should be kept by every apothecary as the source of Hydrated Sesquioxide of Iron. Its strength is such that it requires about an equal measure of commercial solution of Ammonia (sp. gr. .940), to decompose it. The apothecary who is suddenly called upon for the antidote will proceed in the following manner:

Take of Solution of Ter-sulphate of Iron *half a pint;* Solution of Ammonia *half a pint* (or *a sufficient quantity*)*;* Water *a sufficient quantity.* Pour the Solution of Iron into a half-gallon jar, add two pints of Water, and then add the Ammonia, stirring constantly until in slight excess. This is known when, after displacing the air in the jar by blowing, it continues to smell slightly of Ammonia. The contents of the jar are then thrown on a piece of strong muslin, previously well moistened, and the liquid, holding in solution Sulphate of Ammonia, expressed from it as quickly as possible, until the Oxide remains in the cloth of a pasty consistence. The cloth is then opened on a dish, Water added and incorporated with the Oxide by means of a spatula, and then again expressed. If the demand is urgent, the Oxide may be sent without further washing, if not urgent, the washing may be repeated twice more. It is then quickly removed by a spatula from the cloth to a quart mortar, and Water mixed with it by trituration, until it measures a pint, when it should be poured into a wide-mouthed bottle, corked, and the following label attached, viz.:

HYDRATED SESQUIOXIDE OF IRON.

(Ferri Oxidum Hydratum U. S. Pharm.)

Antidote to Arsenic.

This preparation consists of Hydrated Sesquioxide of Iron and Water, in such proportion that each tablespoonful contains thirty grains of the dry Oxide; and is intended to neutralize the poisonous effects of *Arsenious Acid,* or common *White Arsenic,* when taken into the stomach. It is well to precede the administration of this antidote by an active emetic of Ipecacuanha or of Mustard, so that any undissolved arsenic may be thus mechanically removed, if possible. If, however, this has not been done before obtaining the antidote, no time should be lost in giving it. The patient should take a tablespoonful for a dose every five or ten minutes, but if vomiting should intervene, let a dose be given immediately after each attack, unless otherwise directed by the physician in attendance.

When the poisoning has been caused by *Arsenite of Potassa* (Fowler's Mineral Solution), *Soda,* or *Ammonia,* or by the Salts of *Arsenic Acid,* after giving the first dose add six tablespoonfuls of Vinegar to the contents of the bottle, and shake it a few minutes, until the acidity is neutralized, and then give it as above.

When the Oxide is intended for other ferruginous preparations, as, for instance, Citrate of Iron, it should be washed by displacement on a cloth-filter, till the washings cease to precipitate Chloride of Barium. The small amount of Sulphate of Ammonia remaining in the Oxide, when prepared hurriedly as above, is of no account in a case of poisoning. The detail in the above label is not objectionable, as it will be often of use even to the experienced physician, not to speak of the very many who have had but little if any experience in poisoning cases, and will likewise enable any person of ordinary ability to administer the antidote without loss of time. When it is so easy to be prepared for these occasions, every apothecary who has a proper regard for his reputation and duty, will provide the means above detailed, and be ever ready.

FERRI OXIDUM NIGRUM. *Black Oxide of Iron.*

Preparation.—"Take of Sulphate of Iron *six ounces;* Sulphuric Acid (commercial) *two fluidrachms and two fluid scruples;* Pure Nitric Acid *four fluidrachms and a half;* Stronger Aqua Ammoniæ *four fluidrachms and a half;* Boiling Water *three pints.* (The above fluid measures are Imperial.) Dissolve half the Sulphate in half the Boiling Water, and gradually add the Sulphuric Acid; boil; add the Nitric Acid by degrees, boiling the liquid after each addition briskly for a few minutes. Dissolve the rest of the Sulphate in the remainder of the Boiling Water; mix the two solutions thoroughly; and immediately add the Ammonia in a full stream, briskly stirring the mixture at the same time. Collect the black powder on a calico-filter; wash it with Water till the water is scarcely precipitated by a solution of nitrate of baryta, and dry it at a temperature not exceeding 180.°"—*Ed.*

History.—As stated under Prussian Blue, the object of the first part of this process is to convert the sulphate of the protoxide of iron into the sulphate of the sesquioxide, and which is effected by adding nitric acid to the boiling solution. The acid gives oxygen to the protoxide, while, binoxide of nitrogen $NO_2=30$, escapes. The additional quantity of sulphuric acid is required to render the sesquioxide salt neutral, and prevent the precipitate of a basic sulphate of the sesquioxide. When sulphate of the protoxide of iron is added to sulphate of the sesquioxide, we obtain a mixture of sesqui and protosulphates of iron $(FeO+SO_3)+(Fe_2O_3+3SO_3)$. Caustic ammonia precipitates the sesqui and protoxides of iron chemically combined with each other and one equivalent of water, and uniting with the sulphuric acid forms soluble sulphate of ammonia (oxide of ammonium.) 3450 parts of anhydrous sulphate of magnetic oxide of iron (corresponding to three equivalents or 5214 parts of protosulphate) require 852 parts of anhydrous or 8250 parts of hydrated ammonia of sp. gr. 0.960 (= about 10 pr. ct. of ammonia.) The precipitate is easily washed without acquiring a higher form of oxidation. The first portion of the wash water may be evaporated for sulphate of ammonia.—*Witt.*

Black Oxide of Iron thus prepared forms a jet-black, or grayish-black mass, with a velvety appearance, and is attracted by the magnet. It is odorless and tasteless, dissolves in hydrochloric acid, quietly, and without a residue, from which yellowish solution it is precipitated by ammonia. Its formula is $FeO+Fe_2O_3+HO$; its equivalent weight, 116.

The scales which are struck from red-hot iron by the blacksmith's hammer, the *Æthiops Martis* of the old Materia Medicas, consist of chemical combinations of the protoxide and sesquioxide of iron in variable proportions. They are prepared for medicinal use by washing them, freeing them from impurities by the magnet; triturating them, and separating the fine powder by the method directed for making prepared chalk. It is, however, inferior in medicinal virtue to the black oxide prepared as above.

Properties and Uses.—This is an excellent ferruginous tonic, is not changeable when exposed to the atmosphere and dampness, is more readily soluble in the fluids of the stomach than the sesquioxide, and produces no local irritation. The dose is from five grains to a scruple, three or four times a day.

FERRI PERCHLORIDUM. *Ferrum Sesquichloratum. Perchloride of Iron.*

Preparation.—In a roomy glass flask, place *one part* of Metallic Iron (iron filings or turnings) add *four parts* of Hydrochloric Acid, sp. gr. 1.130; when the first violence of the action is over, the flask is digested in the sand-bath as long as evolution of gas occurs, and the liquid then filtered. *Two parts* more of Hydrochloric Acid, and *one part* of Nitric Acid, sp. gr. 1.20, are added, and the whole heated in a flask until the brownish-yellow vapors cease to be evolved; a part of the solution is then poured into a dish and evaporated, with constant stirring, to a syrup, or until a small portion dropped on a piece of porcelain solidifies on cooling (this it will do when the solution is reduced to four times the weight of the Iron dissolved in it); the dish is now put on a glass plate, and covered with a bell-glass. To prevent its attracting moisture from the air, the edge of the bell-glass is greased. The fluid commences to crystallize in a day or two, and when converted into a solid mass, the dish is warmed for a moment, the mass, which is readily separated, must be broken up, put in a well-closed bottle, and kept in a dark place. The salt is more rapidly dried by continuing to stir the fluid, after removing from the fire, until entirely cold. One part of Iron yields nearly four parts of crystallized Perchloride.

M. Beral gives the following formula for this preparation: Take of Peroxide of Iron *five parts*, Hydrochloric Acid *nineteen parts*. Mix in a platina capsule, and boil ten minutes, in order to dissolve the oxide. Concentrate the solution to fifteen parts by a water-bath, let it cool and filter. The solution ought to be of a red-brown color. On the addition of water it becomes yellowish if the mixture is neutral, and almost colorless if it is acid. It is not decomposed by the air. This is the fluid commonly used in medicine.

History.—Metallic iron is rapidly acted on and dissolved by hydrated hydrochloric acid; in order that the evolution of gas be not too rapid, the iron is added to the acid gradually, or vice versa. The chlorine of the acid combines with iron and forms protochloride, while the hydrogen of the acid is evolved. The gas thus set free possesses a disagreeable smell, from the presence of light carbureted hydrogen $= CH_2$, which is formed at the expense of the carbon from which even the best iron is not entirely free. The carbon is present in the iron partly in combination, partly as a mixture; it is the former portion only which forms carbureted hydrogen; the carbonaceous matter mixed with it precipitates as black flakes, and must be separated by filtration. Iron also frequently contains traces of phosphorus and sulphur, in which case phosphureted and sulphureted hydrogen are formed.

In order to convert the protochloride of iron into perchloride, half as much more chlorine is necessary, consequently the addition of two parts of hydrochloric acid to the four parts already contained. The action of some other body is required to place this in a condition to give up its chlorine, which is effected by the addition of nitric acid. 2100 parts of iron require $2730 + 1365 = 4095$ parts of anhydrous hydrochloric acid, or $10,500 + 5250 = 15,750$ parts of sp. gr. 1.130; and 675 parts of anhydrous nitric acid, or 2500 parts of sp. gr. 1.20. Only four parts of acid are ordered for one part of iron, the excess of the latter remaining in the filter. That converted by the additional hydrochloric and nitric acids into sesquichloride can only be evaporated over the fire to the point at which it crystallizes, and not, as is frequently done, to dryness, otherwise it partially decomposes, forming a reddish-brown mass, which on treating with water leaves a residue of oxide of iron. Chloride of iron, containing six equivalents of water, loses, by evaporating to dryness, about half its weight, the residue consisting of one eq. of Perchloride of Iron, two eqs. of peroxide of iron, and one eq. of water; consequently six eqs. are decomposed, six eqs. of hydrochloric acid and eleven eqs. of water being given off. The loss of weight also agrees with the atomic weight, as three eqs. of crystallized Perchloride of Iron $= 8112$; one eq. of anhydrous Perchloride of Iron + two eqs. peroxide of iron + one eq. water $= 4142$; while six eqs. hydrochloric acid and eleven eqs. water $= 3966$. Moreover, the residue contains a trace of protochloride of iron, arising from the decomposition of a very small quantity of perchloride into protochloride and free chlorine.

Perchloride of Iron is seldom obtained in well-defined crystals, but usually in corrugated masses, or a crystalline powder of a brownish-yellow color, which, under a powerful magnifier, appears as an aggregation of yellow transparent, rhombic, tabular, crystals. It has a slight smell of chlorine, powerful acid reaction, and a pungent, saline, astringent, disagreeable taste. It is readily soluble in water, alcohol, and ether. In the air it rapidly deliquesces, forming a brownish-yellow liquid, on which account it is convenient to keep the preparation dissolved in its weight of water ready for use. Exposed to the light the salt becomes of a lighter color, giving off a third of its chlorine and becoming protochloride; for these reasons the action of air and light must be avoided. At a gentle heat, it fuses in its water of crystallization, but by further action of the heat it is decomposed; on continuing to heat the dry mass to redness, the remainder of the water is given off, together with free chlorine and protochloride of iron, from decomposition of a portion of the Perchloride of Iron; another portion of the latter combined with oxide sublimes as a basic chloride; the residue, consisting of an iron-gray mass, when finely rubbed up forms a dark crimson powder, consisting of pure oxide. Any contamination of this preparation with protochloride is known by the blue precipitate the latter forms with ferrocyanuret of potassium. The formula of Perchloride of Iron is $Fe_2\ Cl_3 + 6\ HO$.—*Witt.*

Properties and Uses.—Perchloride of Iron is given in solution, and is a powerful styptic. Internally, it has been successfully administered in epistaxis, hemoptysis, hematemesis, menorrhagia, uterine and other hemorrhages of a passive character. The dose is from five to ten drops in a sufficient quantity of water, and repeating it two, three, or even four times a day. It has also been used in surgery, in the treatment of aneurism and varicose veins; a few drops of a concentrated solution of the perchloride is injected into the arteries or veins, under the influence of which all the blood within a distance of two or three lines is converted in a few minutes into a solid clot. It has not yet been determined what is the real mode of action of this salt on the blood. According to some, it coagulates the whole of the blood and all its elements; according to others, it acts only on the fibrin, and others again contend that its action is confined to the albumen. A solution of the salt, as named above, is the best form of preparation, though it decomposes on standing. A process for preparing the solution has been given by M. du Buisson, but the difficulty is that it contains too much free hydrochloric acid. It is as follows: Pure hydrochloric acid is to be saturated as far as possible with hydrated peroxide of iron; the solution is evaporated over a gentle fire to about one half, and then further evaporated over a water-bath, taking care to remove the aqueous vapors, as these cause the formation of hydrochloric acid and the deposition of oxychloride of iron. When the liquid has thus acquired the consistence of a thick syrup (in this state it crystallizes on being cooled, without, however, assuming a solid mass), the evaporation is stopped, and an excess of gelatinous hydrated peroxide of iron mixed with a little water is added; they are stirred together for a quarter of an hour, and then allowed to stand for several hours. Sufficient distilled water is added to make the density equal to 30° Baumé, and it is then left in contact with excess of hydrated oxide for eight days when it is filtered, and again allowed to stand for fifteen days. The density of this for varicose veins, as preferred by surgeons, is 20° Baumé, and for aneurisms 15° or 20°. This solution is but slightly acid when first prepared, but becomes more acid on being kept, from deposition of oxychloride.

FERRI PHOSPHAS. *Phosphate of Iron.*

Preparation.—"*Ten parts* of freshly prepared Protosulphate of Iron are dissolved in *one hundred parts* of Water, and then mixed with a solution of *thirteen parts* of Phosphate of Soda in *one hundred and thirty parts* of Water (both solutions must be cold). The supernatant liquid is poured off when the precipitate has subsided, the latter washed with cold water, thrown on a filter, drained on several layers of bibulous paper, and dried in the open air with a gentle heat (if possible by the sun); the dry precipitate is rubbed to powder, and kept in a cool place. The yield is about five parts."—*Witt.*

History.—When solutions of ordinary phosphates of soda and protosulphate of iron are mixed together, a white precipitate is formed, which so long as the protosulphate of iron is in excess, is a hydrated tribasic phosphate of protoxide of iron$=3\ FeO+P_{\times}O_5+8\ HO$. This precipitate acquires, almost directly after its formation, a bluish-gray shade, which by washing becomes somewhat stronger, and exposed to the air the precipitate becomes, as it dries, blue throughout. If, on the other hand, an excess of phosphate of soda is used, it is not, under similar circumstances, of a pure blue tint when dry, but has a tinge of gray, or sometimes a greenish-gray color. In such a precipitate, we find the proportion of iron to phosphoric acid is not 3 to 1, but 19 to 6, or 16 to 5; that is the iron predominates. But even the precipitate obtained by excess of protosulphate of iron, and equally carefully dried, will be of a dirty-blue color if the supernatant liquor is not poured off the precipitate so soon as it is thrown down. This liquid, which contains protosalt of iron, soon begins to change, and the protophosphate of iron is raised to a sesquiphosphate$=Fe_2\ O_3+P_{\times}O_5+8\ HO$, which precipitates. If the protosulphate of iron is old and partially oxidized, the preparation, even with the greatest precaution, will be grayish-green instead of blue.

Protophosphate of iron is a beautiful lavender-blue, odorless and tasteless powder. When exposed to a moderate warmth, it instantly loses its blue color, becoming a greenish-gray; more strongly heated, the water is given off, the proto is converted into a sesqui-salt, and the residue is a grayish-brown. It is not dissolved by water, but is by acids. Hydrochloric acid forms a greenish-yellow solution with it; in the solution ferrocyanuret of potassium readily detects the protoxide of iron by its blue precipitate, and sulphocyanuret of potassium, the peroxide of iron, by its blood-red color. If the hydrochloric solution is thrown down by excess of ammonia, the supernatant liquid must be colorless; a blue color would denote copper.—*Witt.*

Properties and Uses.—Phosphate of Iron is a valuable chalybeate tonic. It has been recommended as a remedy in cancer, to be used internally, and also applied to the diseased part; likewise to restore and invigorate the virile powers. Marked advantage has been derived from its use in febrile diseases. The dose is from one to ten grains, three times a day.

Dr. Routh has met with much success in some cases of anemia and debility, brought on by venereal or other excesses, over-study, and depressing diseases, by the use of a new preparation of Phosphate of Iron, which he has found better adapted for a speedy cure than other preparations of iron; it has likewise been of much benefit in cases of virile weakness from onanism, or other causes. It is prepared by adding as much Phosphate of Iron as the metaphosphoric acid, $HO\ PO_5$ in a boiling state would take up, and allowing it to cool. The proportions will be found nearly two of acid to one of the phosphate. The solution obtained is of a semitransparent, greenish or slaty hue, which hardens on exposure to the air for a day; but mixed with liquorice powder or flour, it can be at once made up into pills. The compound is soluble in any proportion of water, and free from any nauseous, inky taste. It is not yet analyzed, to know whether it is a superphosphate of iron, or a mere solution of the phosphate in the acid. It does not gripe or constipate, and has proved beneficial in cases of debility, where there is a prevalence of nervous symptoms, or a large quantity of phosphates voided by urine. Dose, one or two grains, three times a day—in some instances combined with an equal proportion of phosphate of quinia.

E. Souberain gives the following formula for a syrup of pyrophosphate of iron, for persons who can not take other preparations of iron: Take of sulphate of sesquioxide of iron 55.4 grains; water 924 grains. This is to be slowly dissolved, which sometimes occupies two or three days, but it is preferable to put it into a flask, and to dissolve it in a water-bath. Then take of crystallized pyrophosphate of soda 462 grains, pure water seven fluidounces and six fluidrachms, distilled peppermint-water three and a half fluidounces; this is to be dissolved cold or at a gentle heat, and then to the cold solution is to be added the previously described solution of persulphate of iron. At the moment of admixture, a precipitate is formed, which, however, soon dissolves; the liquor is to be filtered, and one pound five ounces, avoirdupois, of white sugar added. Dissolve without heat, in a glass vessel. If heat, or a temperature above 122° F., be employed, the syrup will assume the color of wine-dregs: and at 160° to 18 0°, it will become very dark.

Pyrophosphate of soda is prepared by drying ordinary phosphate of soda, and fusing it at a red heat: the mass then dissolved in boiling water, and the solution filtered and crystallized. By these means a salt is obtained, having for its formula $2\ NaO+PO_5+10\ Aq$. It contains 40 per cent. of water of crystallization. It forms a white precipitate with salts of silver, instead of a yellow one as formed by the ordinary phosphate of soda.

The pyrophosphate of iron corresponds to the preceding salt. Its formula is $2\ Fe_2\ O_3+3\ PO_5$. It is insoluble in water, but soluble in pyrophosphate of soda.—*Lond. Pharm. Jour. and Trans. XII.*, 498. For other syrups of Phosphate of Iron, see *Am. Jour. Pharm.*, *XXVI.*, 111 *to* 115.

FERRI PULVIS. *Powder of Iron. Reduced Iron. Iron by Hydrogen.*

Preparation.—"Take of Peroxide of Iron, Zinc, in small pieces, Oil of Vitriol, Water, each, *a sufficient quantity;* introduce into a gun-barrel as much of the Peroxide of Iron as will occupy the length of about ten inches, confining it to the middle portion of the barrel by plugs of asbestos. Let the gun-barrel be now placed in such a furnace as is used for organic analysis, one end of it being fitted, by means of a cork, into a bent adapter, whose further extremity dips in water, while the other end (of barrel) is connected with a bottle containing the Zinc and Water; with the intervention, however, of a desiccation-tube, including fragments of Caustic Potassa, and a small bottle half-filled with Oil of Vitriol. Matters being thus arranged, a little Oil of Vitriol is to be poured into the bottle containing the Water and Zinc, with the view of developing a sufficiency of hydrogen to expel the air from the interior of the apparatus. As soon as this object is considered to have been accomplished, the part of the tube containing the Peroxide of Iron must be surrounded with ignited charcoal, and, when it is thus brought to a low red heat, the Oil of Vitriol is to be gradually added to the Zinc, so as to cause a steady current of hydrogen to pass through the Oil of Vitriol and desiccation-tube into the gun-barrel. As soon as the reduction of the Oxide is completed, which may be judged to have taken place when the gas-bubbles escape at apparently the same rate through the water in which the adapter terminates, and through the bottle containing the Oil of Vitriol, the fire is to be removed (a slow current of hydrogen being still continued), and, when the gun-barrel has assumed the temperature of the air, its metallic contents should be extracted, and preserved in an accurately-stopped bottle." —*Dub.*

Mr. A. Morgan, apothecary to Sir Patrick Dun's Hospital, Dublin, recommends the following process as a certain and easy way of furnishing a cheap Powder of Iron: Eight ounces of yellow prussiate of potash are to be heated in an oven till the water of crystallization is driven off, reduced to a very fine powder, then thoroughly mixed with four ounces of red oxide of iron (previously well washed and finely pulverized, and three ounces of pure dried carbonate of potassa.) This mixture is then to be introduced (a small portion at a time) into a crucible previously heated to low redness. The heat must be kept up till all appearance of effervescence has ceased. The crucible is then allowed to cool, the mass scooped out, powdered, and having been introduced into a large bottle, repeatedly washed by agitation and decantation with distilled water, till the washings cease to precipitate with solution of nitrate of silver. The powder is then to be turned out on a filter, and dried as rapidly and with as little exposure to air as possible. It may now, if necessary, be passed through a fine sieve to separate any particles which may have agglutinated, owing to the application of too high a heat. The powder should be preserved in a well-stopped bottle. With this process and the quantities mentioned, the product obtained will weigh about three ounces and a half.

As thus obtained, the Reduced Iron is a fine powder, of a dark gray color, not feeling gritty or coarse under the fingers; it dissolves completely in muriatic acid with considerable effervescence, and the solution thus obtained yields with potassa or ammonia, the greenish gelatinous precipitate indicative of a protosalt. If the precipitate be reddish, it shows the powder to contain oxide of iron. Water digested on the powder should not precipitate with solution of nitrate of silver ; that would indicate that all the cyanide of potassium had not been washed out. For the chemical actions in this process, see *Am. Jour. Pharm.*, *CXII.*, 450.

Wöhler recommends the following process :—Pure crystals of sulphate of iron are heated in an iron pan until perfectly dehydrated, the powder mixed with two or three times its weight of pure dry chloride of sodium, introduced into a clay crucible, and heated to redness until it melts. When the melted mass is cold, it is washed with water, and the oxide of iron remains as a crystalline powder of blackish-red color. The oxide of iron thus obtained is reduced by ignition to redness in a current of dry hydrogen, either in a glass tube or gun barrel. The gas is generated from iron and sulphuric acid, and care must be taken that the latter is not arsenical. The gas is dried either by sulphuric acid, or oxide of calcium, introduced between the generator and the tube containing the oxide. As soon as atmospheric air is displaced from the apparatus, the tube is heated to full redness, and the temperature and current of hydrogen maintained so long as the formation of water is observed at the open end of the tube. When this is at an end, the tube is removed from the fire, closed at each end, and when cold the reduced iron transferred to a bottle. Care must be taken to prevent access of air to the Reduced Iron while hot, as it is highly pyrophoric in this state. The reduced iron thus prepared should not appear black in places, which would show that the reduction was imperfect. It should consist of small gray lamellar crystals, of the same form as the oxide of iron. These crystals are porous pseudomorphs, and may therefore be reduced to very fine powder with ease. The powder should be light-gray without luster, when pressed with a polished substance should acquire metallic luster, and burn readily when heated. It should be perfectly soluble in dilute sulphuric acid with evolution of hydrogen.—*Lond. Pharm. Jour. & Trans. XIV.*, 575.

H. Zängerle suggests that this article can be made by igniting five parts of protoxide of iron, six parts of anhydrous ferrocyanuret of potassium, and one and three-quarter parts of anhydrous carbonate of potassa; the ignition is maintained until the evolution of gas ceases. The fused mass, on cooling, is thoroughly washed with pure water, and the residue dried. The product is a dark-gray powder, which is metallic iron in a state so finely divided as to burn throughout when any part is touched with a lighted match.

For some valuable remarks on preparing Iron by Hydrogen, see paper by Prof. W. Procter, jr., in *Am. Jour. Pharm. XIX.*, p. 11, and *XXVI.*, p. 217.

History.—This preparation was introduced into medicine by Quevenne, as a substitute for porphyrized iron. Powder of Iron when thoroughly deoxidized is of a slate-gray color, readily acted on by dilute acids, evolving hydrogen gas, and forming a protosalt of iron. When of a black color it should be rejected. It oxidizes rapidly, and hence should be kept in dry and well closed bottles.

Properties and Uses.—A valuable tonic, and is considered to be superior to any other form of metallic iron for medicinal employment. It is without inky flavor, and is not liable to blacken the teeth. Its tendency to oxidize, and the unpleasant eructations of hydrogen gas to which it gives rise, render it objectionable. It may be used in chlorosis, anemia, and in all diseases in which there is a deficiency of red blood-corpuscles. The dose is from one or two grains to ten or twelve, in pill or bolus.

FERRI SESQUIOXIDUM. *Sesquioxide of Iron. Red Oxide of Iron.*

Preparation—Expose Sulphate of Iron to heat, until the water of crystallization is expelled. Then roast it by an intense fire so long as acid vapors arise. Wash the Sesquioxide until the washings, when examined by litmus, appear free from acid. Lastly, dry it on bibulous paper.—*Dub.*

History.—Sesquioxide of Iron is an odorless, and tasteless, dark, crimson-red powder, not magnetic, insoluble in water, dissolved, but not readily, by hydrochloric acid without any gas being evolved, and forming a golden yellow solution, which is not changed to a blue by ferrocyanuret of potassium unless protoxide of iron is present. It is anhydrous, and has been called *Colcothar*, and *Crocus Martis Astringens.* In the above process the water and sulphuric acid of the crystallized sulphate of iron are evolved; the iron is sesquioxidized at the expense of a portion of the sulphuric acid, while some sulphurous acid is evolved.

M. A. Vogel recommends the following as a preferable method of preparing a Red Oxide of Iron or colcothar, for safely and successfully polishing glass and metals, without any previous washing; producing a very fine polish without scratching. Into a solution of sulphate of iron made with boiling water and filtered, a concentrated solution of oxalic acid is poured, until the yellow precipitate of oxalate of iron is no longer formed. When the liquor has entirely cooled and ceased to deposit any more, the precipitate is washed on a cloth with hot water until the water ceases to acquire an acid reaction. The oxalate of iron, not yet perfectly dry, is in the next place heated on a plate of iron over a charcoal fire or a lamp. The decomposition of the salt commences at about 400° F., and at a temperature a little higher than this the Red Oxide of Iron is formed in a very finely divided state.

Properties and Uses.—It possesses tonic and somewhat styptic properties, and is used principally in strumous and neuralgic affections, in combination with extract of conium. The dose is from two to eight grains, three or four times a day.

The *Red* or *Styptic Powder* is prepared by merely submitting sulphate of iron two parts, and alum one part, to a red heat, and continuing it until a reddish substance is formed ; it undoubtedly contains a portion of acid. It is powerfully astringent and styptic, and is used as an application to bleeding piles, and external hemorrhages ; it is usually applied in the form of ointment, and may also be given internally for the same purposes.

FERRI SUBCARBONAS. *Subcarbonate of Iron. Precipitated Carbonate of Iron.*

Preparation.—"Take of Sulphate of Iron *four pounds;* Carbonate of Soda *four pounds and two ounces;* Boiling Water *six gallons* (Imperial measure). Dissolve the Sulphate and Carbonate separately, each in three gallons of the Water. Mix the solutions together while yet hot, and then let the precipitate subside. Pour off the supernatant liquor, wash the precipitate repeatedly with water, and dry it."—*Lond.*

History.—In the above process a double decomposition takes place; one equivalent of sulphate of iron is decomposed by one equivalent of the carbonate of soda; which reaction precipitates one equivalent of the proto-carbonate of iron, while one equivalent of sulphate of soda remains in solution. By exposure to the air during the washing and drying, the proto-carbonate of iron is decomposed,—the protoxide of iron is converted into sesquioxide by its combination with the oxygen of the atmosphere, while carbonic acid is disengaged. It usually contains a small portion of undecomposed proto-carbonate of iron, and hence is known by the name Subcarbonate of Iron, which distinguishes it from the sesquioxide of the preceding article.

Subcarbonate of Iron, as found in the shops, is a brownish-red powder, of a somewhat astringent taste, odorless, not magnetic, and not dissolved by water. It is soluble in hydrochloric acid, with feeble effervescence, which solution affords a deep blue precipitate with the ferrocyanuret of potassium, a purplish-black precipitate with tincture of nut-galls, a brownish-red precipitate with the alkalies, and a red color with sulphocyanic or meconic acid. If it contain copper, a bright rod of iron dipped into the above solution will have that metal deposited on it. After the sesquioxide has been thrown down by ammonia from the hydrochloric solution, the supernatant liquor should give no indication of containing any other metal in solution when chloride of barium, ferrocyanuret of potassium, or sulphureted hydrogen are added.—*P.*

Properties and Uses.—In large doses it is apt to occasion nausea, with a heavy sensation in the epigastric region, and other dyspeptic symptoms; it also renders the stools black. It is an excellent chalybeate tonic and alterative, and has been successfully used in chorea, neuralgia, chlorosis, and anemia. Sometimes used in intermittent fever, when connected with an anemic condition or where the nutritive functions are deranged. In chronic diarrhea and dysentery, enlargement of the liver and spleen, epilepsy, dropsy, cancer, scrofula, and diseases of the urinary organs, connected with debility, it has been successfully used. The dose is from five grains to two drachms, three times a day; no nicety need be observed in the dose; though I see no necessity for large doses of any of the chalybeates, as the system can take up but a small portion daily for its own uses. It may be used as an inferior substitute for the hydrated sesquioxide of iron in cases of poisoning by arsenic, when the hydrated oxide can not be at once obtained.

Off. Prep.—Tinctura Ferri Chloridi.

FERRI SULPHAS. *Sulphate of Iron. Sulphate of Protoxide of Iron. Green Vitriol. Copperas.*

Preparation.—"In a glass flask, or, on the large scale, in a leaden vessel, are mixed *six parts* of Concentrated Sulphuric Acid with *twenty-four parts* of Water, and *four parts* of pure Iron (turnings or filings); the whole, frequently stirred with a porcelain or wooden spatula, is allowed to digest for one day; the vessel is now placed on the fire, and heated as long as any gas is evolved, then filtered, the hot filtrate mixed with *one-fourth part* of Concentrated Sulphuric acid, and allowed to stand two days in a cool spot. The crystals which have formed, are freed from the mother-liquor, and spread out on paper, if possible, in the sun to dry; then kept in a well-closed bottle or stone jar. The solution yields, on concentration, a considerable portion of salt, and generally from the above proportion of ingredients, seventeen parts of protosulphate are obtained."—*Witt.*

The Dublin Pharmacopœia gives the following formula: "Take of Iron Wire, or turnings of Wrought Iron, *four ounces* (avoirdupois); commercial Oil of Vitriol *four fluidounces;* Distilled Water *one pint and a half.* (The fluid measures being Imperial). Pour the Water on the Iron placed in a porcelain capsule, add the Oil of Vitriol, and when the disengagement of gas has nearly ceased, boil for ten minutes. Filter now through paper, and having separated the crystals which, after the lapse of twenty-four hours, will have been deposited from the solution, let them be dried upon blotting-paper placed upon a porous brick, and then preserved in a well-stoppered bottle." Bonsdorff recommends in filtering, to have the inferior extremity of the funnel touch the bottom of the vessel into which the liquid filters, thereby causing the fluid, as it drops, to be less acted upon by the oxygen of the atmosphere, and consequently less disposed to form peroxide.

History.—"Concentrated sulphuric acid has no action on iron in the cold, but mixed with a certain portion of water, a lively effervescence ensues; the oxygen is separated from a part of the water, and unites with the iron, the protoxide of iron thus formed combines with the sulphuric acid, and the hydrogen escapes. In order to dissolve 350 parts of iron, independently of the water necessary for its dilution, 613 parts of monohydrated sulphuric acid are necessary; in the proportions above given there is an excess of acid; this is rather advantageous than otherwise, as it prevents the solution of any traces of copper that may exist with the iron. Most of the iron dissolves in the cold, and it is only toward the end that the action is to be assisted by warming. Beside the excess of iron (which after the filtration may be washed with water, and quickly dried), there remains on the filter, carbonaceous matter and a little silica. Even the best iron contains a little carbon, which is partly in chemical combination, and partly a mechanical admixture: the latter separates in black flakes, but the former at the moment of its liberation combines with hydrogen, and is given off as the highest carbureted hydrogen (Marsh gas $= CH_2$), imparting to the hydrogen its unpleasant odor. The quantity of carbureted hydrogen which separates is considerable, if, instead of pure sulphuric acid, the ether residue is employed, for the latter contains a carbonaceous matter in solution (to this it is indebted for its brownish color), which yielding up its carbon to the hydrogen, causes at the same time an entire decolorization of the acid. If traces of phosphorus and sulphur are present, the evolved gases are not free from phosphureted and sulphureted hydrogen, and we then have a nauseous odor. The solution, when filtered clear, and previous to crystallization, is, while still warm, mixed with some sulphuric acid, which prevents its higher oxidation; the free acid becoming in a certain degree a protecting cover to the salt."—*Witt.*

Pure protosulphate of iron crystallizes in bluish-green oblique rhombic prisms, is odorless, and possesses at first a saline, and then a sweetish, astringent taste. At the ordinary temperature it requires scarcely two parts of water for its solution; of hot water three fourths of its weight; the clear solutions retain the color of the salt, and have an acid reaction. It is insoluble in alcohol. Exposed to the air, the crystals effervesce; they lose six equivalents of water, and become covered with a white powder $= FeO + SO_3 + HO$, which from the absorption of oxygen gradually changes to yellow, loses another atom of water, and forms sesquisulphate of sesquioxide of iron. Such a partially oxidized salt dissolved in water separates into neutral sulphate $= Fe_2O_3 + 3SO_3$, which remains in solution, and into the basic salt $= Fe_2O_3 + 3SO_3, 8HO$, which precipitates as a yellowish-brown powder. The same yellowish-brown powder precipitates from a solution of protosulphate of iron when exposed to the air, while the solution becomes at the same time of a yellow color, and contain sesquioxide. When heated protosulphate of iron fuses in its water of crystallization, leaving a white powder, which heated more strongly in the air absorbs oxygen, and becomes red; heated gradually to redness, it evolves sulphuric acid, water, and sulphurous acid, while a dark crimson-red powder of pure sesquioxide of iron remains. The separation of sulphurous acid is occasioned by the decomposition of the sulphuric acid of part of the salt, which as such, is not separable from the protoxide of iron, but the latter combining with one equivalent of its oxygen forms sesquioxide, and then the sulphurous acid is given off. The impure Sulphate of Iron met with in commerce should not be used in medicine. Any contamination of protosulphate of iron with sesquisulphate may be known by the gray or greenish-yellow color of the crystals, and chemically by sulphocyanuret of potassium which renders its solution red. If ammonia be heated with a solution, it assumes a blue color if oxide of copper is present. Oxide of zinc may be detected by heating the Sulphate of Iron with nitric acid, adding excess of solution of caustic potassa, after a short time heating, filtering, and dropping hydrosulphate of ammonia into the filtrate; a white precipitate insoluble in acetic acid will occur if zinc be present. If on treating the solution with acetic acid it partially or entirely disappears, alumina is present, in which case the acetic-acid solution is rendered turbid by excess of ammonia. To detect magnesia, all the metals, and any alumina that may be present, are precipitated by hydrosulphate of ammonia, and to the filtered liquor add phosphate of soda, which forms with magnesia insoluble ammonio-phosphate of magnesia. Should oxalate of ammonia also cause a precipitate, lime is present, and must be removed previously to testing with phosphate of soda.—*Witt.* The formula of crystallized Sulphate of Iron is $\mathrm{Fe\,O+SO_3+7\,HO}$; its equivalent weight 139.

The Dublin Pharmacopœia also orders a Granulated Sulphate of Iron, *Ferri Sulphas Granulatum*, which is preferred in the preparation of the anhydrous or dried Sulphate of Iron; it is prepared as follows:—"Take of Iron Wire or turnings of Wrought Iron *four ounces* (avoird.); commercial Oil of Vitriol *four fluidounces*; Distilled Water *a pint and a half*; Rectified Spirit *ten fluidounces.* (The fluid measures being Imperial.) Pour the Water on the Iron placed in a porcelain capsule, add the Oil of Vitriol, and when the disengagement of gas has nearly ceased, boil for ten minutes. Filter now through paper into a vessel containing eight fluidounces, Imp. meas. of the Spirit, and stir the mixture as it cools, in order that the salt may be obtained in minute granular crystals. Let these, deprived by decantation and draining off the adhering liquid, be washed on a funnel or small percolator with the remainder of the Spirit; and, when rendered quite dry by repeated pressure between folds of filtering paper, and subsequent exposure for twenty-four hours beneath a glass bell over a common dinner plate half filled with Oil of Vitriol, let them be preserved in a well stopped bottle."

Properties and Uses.—In small doses, Sulphate of Iron causes more or less constipation, is absorbed, and acts as a tonic, astringent, and emmenagogue; it blackens the stools. In large doses it causes pain, heat, uneasiness at the pit of the stomach, and retchings and emesis. In excessive doses it is an irritant poison, acting chemically on the albumen and other organic constituents of the tissues. The stomach is more or less injured by a long continued use of it. It has been used as a tonic in scrofula, dyspepsia, chlorosis, amenorrhea, and in debility following protracted diseases. In phthisis pulmonalis the following preparation has been found very serviceable; it relieves cough, assists expectoration, improves the appetite and digestive functions, and invigorates the whole system:—Take of commercial Sulphate of Iron *six drachms;* Whisky or good Holland Gin *half a pint*; mix together. The dose is half a fluidrachm every two hours. As an astringent, Sulphate of Iron is given in humid asthma, passive hemorrhages, chronic mucous catarrh, leucorrhea, gleet, diabetes, old dysenteric affections, etc. The dose is from half a grain to six grains pill form. From one to ten grains of the Sulphate of Iron dissolved in a fluidounce of water has been found useful as a collyrium in chronic ophthalmia, a wash in some skin diseases, and as an injection in gleet, and chronic dysentery, prolapsus of the rectum, etc. Six or eight pounds thrown into a privy, disinfects it; the products being sulphate of ammonia and hydrated sulphuret of iron.

M. Monsel, surgeon to the Military Hospital at Bordeaux, recommends a *Persulphate of Iron*, as an hæmostatic, to be prepared as follows:—"Distilled water 100 grammes; sulphuric acid, 69° Baumé, 10 grammes. Place these in a porcelain capsule capable of holding one half a litre. To this add protosulphate of iron 50 grammes. When the salt is dissolved, and the solution has reached a boiling point, add, in small quantities at a time, nitric acid, 35° Baumé, 16 grammes. During this process an abundance of nitric oxide vapors are evolved, which, however, cease in a short time. As soon as the red vapors cease to be disengaged, again add, in small quantities at a time, protosulphate of iron 50 grammes. This again sets free the nitric oxide; the solution is boiled till this ceases. Hot water is now added until the volume of 100 grammes is obtained, and the solution is set aside to cool, after which it is carefully filtered. The solution is transparent, having a deep, reddish-brown color, odorless, very astringent without causticity, and should mark 45° *pese sels.* After 36 hours standing, there is deposited an insoluble powder, from which the solution is again filtered, after this powder ceases to be precipitated. Concentrate the filtered liquid, by boiling, to the consistence of honey, then pour it in thin layers on glass plates, and dry in a stove at 95° F. Thus prepared it forms reddish scales resembling those of citrate of iron, and dissolves in water or alcohol without decomposition. The aqueous solution, of sp. gr. 45° Baumé, after long digestion will dissolve peroxide of iron, and on the addition of sulphuric acid loses its color. It contains one-fourth water; its formula is $5\,SO_3\,2\,FeO_3$. If in drying, the heat be carried above 100° F., the salt becomes anhydrous, and has a greenish tint.

The action of this salt on blood and albumen is powerful; with the former it produces a voluminous clot, *absolutely insoluble*, which continues to enlarge for several hours after its application, and becomes quite hard and firm. Dr. H. H. Toland, of San Francisco, California, who has successfully used this salt, says, "if applied to a superficial wound as soon as made, not a drop of blood escapes, and no pain results from the application. It acts by producing instantaneous coagulation of the blood, and will be found invaluable in hemorrhage from the mouth, nose, and throat, when it is impossible to ligate the vessel, and may be equally efficacious in alarming uterine hemorrhages, either, active or passive. In solution it could be readily applied; it is very deliquescent, and dissolves speedily in water."—*Pacific Med. and Surg.*, *July*, 1858.

Off. Prep.—Ferri Carbonas Saccharatum; Ferri Citras; Ferri et Quiniæ Citras; Ferri Ferrocyanuretum; Ferri Oxidum Hydratum; Ferri Oxidum Nigrum; Ferri Phosphas; Ferri Subcarbonas; Ferri Sulphas Exsiccatum; Ferri Valerianas; Pilulæ Ferri Carbonatis; Pilulæ Ferri Compositæ; Tinctura Ferri Acetatis.

Ferri Sulphas Exsiccatum. *Dried Sulphate of Iron.*

Preparation.—Expose *any convenient quantity* of Sulphate of Iron to a moderate heat, in a porcelain or earthenware vessel, not glazed with lead, till it is converted into a dry, grayish-white mass, which is to be reduced to powder.—*Ed.*

The Dublin Pharmacopœia orders of "Granulated Sulphate of Iron *any convenient quantity;* expose the salt in a porcelain capsule to an oven heat not exceeding 400° F., until aqueous vapors cease to be given off, and, having then reduced it to a fine powder, preserve it in a well-stopped bottle."

History.—By exposure to a moderate heat, the crystals lose six-sevenths of their water of crystallization; so that 85 grains of dried sulphate are equivalent to 139 grains of the crystallized sulphate, or three grains are equal to $4\frac{9}{10}$ grains of the crystals. If the heat be over 400° F., the salt will be reduced to an oxide, the sulphuric acid being driven off.—*P.* The granulated sulphate is best adapted for the preparation of the anhydrous salt.

Properties and Uses.—Same as sulphate of iron; to be used in pill form. Externally, in solution, as an astringent lotion for indolent ulcers, and as an injection in leucorrhea and gonorrhea of females.

Off. Prep.—Lotio Hydrastis Composita; Pilulæ Polygoni Compositæ.

Ferri Sulphuretum. *Sulphuret of Iron.*

Preparation.—"The best Sulphuret of Iron is made by heating an iron rod to a full white heat in a forge, applying a stick of sulphur to the end of the rod, and allowing the fused globules of Sulphuret which form to fall into a deep vessel filled with water. These should be freed of sulphur and kept in a close vessel.

An inferior kind, but sufficiently good for pharmaceutic purposes, may be obtained by mixing thoroughly together Sublimed Sulphur *one part*, and Iron Filings *three parts.* Heat the mixture in a covered crucible till it becomes red hot, then remove the crucible from the fire, still keeping it covered, and allow the action to go on without any further heat."—*Ed.*

History.—There are several Sulphurets of Iron, but only one used in pharmacy, viz.: the protosulphuret. Iron and sulphur combine at a red heat to form simple sulphuret, any excess of sulphur being given off, and coming in contact with the air ignites, and forms sulphurous acid=SO_2. Three hundred and fifty parts of iron require 200 parts of sulphur, but an excess of the latter is always necessary, as, before the combination of the two is complete, a portion has been volatilized. When made by the latter process, the crucible must not be opened until quite cool, otherwise the mass absorbs oxygen with avidity, becoming partly converted into a sulphate of iron.

The mass must be removed from any unmixed sulphur. In the first process, to be successful the iron must be raised to a full white heat; at a lower temperature the sulphur is merely fused on its surface; but if the heat be high enough, the two bodies unite with the emission of brilliant sparks, and the protosulphuret is instantly formed, and falls down in a fused and incandescent state, and on being received in the water, brownish-yellow globules are obtained, having a somewhat crystalline texture.

Sulphuret of Iron varies in appearance according to its mode of preparation, by the first-named process it is yellowish, by the second a dark-gray mass, heavy, full of blisters, of a partly metallic luster, odorless and tasteless. Kept in a close vessel, it undergoes no change; on the other hand, in the air, especially if moist, it oxidizes and acquires an inky taste. In dilute sulphuric or hydrochloric acid it must, with a powerful evolution of sulphureted hydrogen gas, gradually and almost entirely dissolve (a thorough solution must not be expected, on account of the carbon in the iron), and the gas must be entirely absorbed by a solution of acetate of lead, else it contains free hydrogen.—*Witt.* Its formula is $Fe\ S=44.12$.

Properties and Uses.—Sulphuret of Iron is used in pharmacy and chemistry for procuring *Hydrosulphuric acid* or *Sulphureted Hydrogen gas.* Diluted sulphuric or hydrochloric acid is added to it, in a proper vessel, and the sulphureted hydrogen is disengaged as a gas, and may be collected over warm water, or solution of salt. In this process water is decomposed; the oxygen converts the iron into protoxide, which combines with the sulphuric acid, forming a protosulphate of iron, while the hydrogen of the water, with the liberated sulphur, forming a gas, the sulphureted hydrogen which is evolved. The excess of water in the dilute acid is of use in promoting the action by keeping in solution the salt which forms. Sulphureted hydrogen is a transparent, colorless gas, having the odor of rotten eggs, and a specific gravity of 1.178. It reddens litmus, burns in the air with a bluish flame, producing sulphurous acid gas and water, and depositing sulphur on the sides of the vessel in which it is burned. In bottles not quite full, or imperfectly corked, it becomes milky, a white powder is thrown down, and this can go on until the water contains no scent of the gas. This is owing to the combination of the atmospheric oxygen with the hydrogen, forming water. If the washing of this gas is omitted it may contain sulphuric acid, known by chloride of barium rendering it turbid. In order to preserve the gas in a bottle that has been opened, as long as possible, it should, after being well corked, be inverted in a vessel of cold water, entirely to cover the neck. Water absorbs two or three times its volume of the gas, and acquires its smell and a nauseous sweetish taste. Sulphureted hydrogen blackens white lead and solutions of the salts of lead, copper and bismuth. Under a pressure of 17 atmospheres at 50° F., it condenses into a limpid liquid of sp. gr. 0.9, and which freezes at 122° F., forming a white, crystalline, translucent substance. When respired, even although much diluted with air, it is highly deleterious, and as it is often formed where animal matters or excrements putrefy, as in burying-vaults or cloacæ, it not unfrequently causes the death of the workmen who suddenly come in contact with it. When air is moderately diluted with it, its respiration causes immediate insensibility with depression of all the powers of life; still more diluted, it causes convulsions and when air is but slightly contaminated with it, it causes nausea, debility, and headache. The smell of the gas ought, in all cases, to be viewed as a warning of danger. As the gas is very deleterious to organic life generally, and as it is said not to be so dangerous when locally applied, it might form an excellent local application to destroy cell-formations, as in cancer, etc. It forms hydrosulphurets, sulphohydrates, or hydrosulphates with bases. Its formula is HS, and its equivalent weight 17.

Kemp has contrived a very simple apparatus for generating sulphureted hydrogen for pharmaceutial and chemical purposes, which may be easily constructed, and admits of the evolution of the gas being discontinued at pleasure. It consists of a tall, cylindrical glass jar, with a lateral tubulure near the top. On the top of the jar a thick plate of ground glass is made to fit air-tight upon the ground edge of the jar; in the center of this plate is a hole to admit cork, through which passes a copper-wire, supporting a perforated leaden or earthen ware basin for holding the sulphuret of iron. A washing-tube, fitted by a cork into the lateral tubulure, and the delivery-tube is connected with it at its further extremity by a piece of vulcanized caoutchouc. In using this apparatus, the cylinder is one-third filled with dilute acid, the sulphuret of iron placed in the leaden basin, and the glass plate fitted on tight with a little grease. When gas is required, the basin is lowered into the acid by means of the copper-wire, and when a sufficient quantity has been obtained, it is again drawn up. When large quantities of the gas are required, the basin may be fully immersed, but only just below the surface, because then the solution of iron-salt being denser than the acid, falls to the bottom of the jar, and is replaced by the acid. *Pharm. Jour. and Trans. XIV.*, 281.

The following has cured several cases of syphilis; heat a piece of Steel to a welding heat, apply a roll of Sulphur to it, and let the drops fall in Cold Water. Pulverize these globules or drops, and add one tablespoonful to a pint of Whisky. Let the mixture macerate for a few days. The dose is a tablespoonful five or six times a day.

FERRI TANNAS. *Tannate of Iron.*

Preparation.—"Take of pure Tannic Acid *nine ounces;* Precipitated Subcarbonate of Iron *forty-four ounces;* Water *a sufficient quantity.* Dissolve the Tannic Acid in sufficient water, and boil the solution, to which, while boiling, add gradually the Subcarbonate of Iron, moderately dried; agitate the solution till effervescence ceases. Evaporate the mixture in a porcelain vessel, at a temperature of 176° F., until it becomes thick; then spread it on glass or porcelain to dry in a stove at 95°." *Beneditti. Buchner's Repertorium XLV., S.* 289, 1847.

History.—According to the above process Tannate of Iron forms in blue scales, it is not dissolved by water, and has no taste.

Properties and Uses.—Tannate of Iron possesses tonic and astringent properties. It has been used with benefit in chlorosis, amenorrhea, chronic diarrhea, and in the diarrhea accompanying some febrile diseases, etc. The dose is two or three grains, made into pills, and gradually increased, so that in the course of a day thirty grains may be given.

FERRI VALERIANAS. *Valerianate of Iron.*

Preparation.—To clean Iron Filings, in a Wedgewood mortar, add gradually an *equal weight* of Valerianic Acid, and stir constantly. In an hour, add Distilled Water; gently warm the whole in a flask, and filter. The surface in contact with the air becomes covered over with a crystalline layer of the Valerianate; collect this on a filter, and expose as before, repeating the process as long as crystals are obtained.—*Ruspini.*

Or it may be prepared according to Wittstein's method: To a solution of *three parts* of crystallized Sesquichloride of Iron in *one hundred parts* of Water, add a cold solution of Valerianate of Soda, made by saturating *five parts* of oily Valerianic Acid in *sixty* of Water with Carbonate of Soda, and then boiling the liquid to expel all the Carbonic Acid. The Valerianic Acid drives off the Carbonic Acid from the Carbonate of Soda, and uniting with the base forms a neutral salt.

1500 parts of the terhydrated Valerianic Acid require 1790 parts of crystallized carbonate of soda. It is necessary to boil the solution to drive off all the carbonic acid. If this neutral solution is added in sufficient quantity (as long as it causes a precipitate), to a solution of sesquichloride, or any sesquisalt of iron a dark quick-red precipitate of Valerianate of Iron is formed, and readily soluble sulphate or chloride of soda. 4500 parts of Valerianic Acid saturated with soda require 2704 parts of crystallized Sesquichloride of Iron, or 3513 parts of dry sesquisulphate of Iron. The affinity between the oxide of iron and Valerianic Acid is so feeble that a gentle heat will remove most of the acid; consequently the precipitation should take place only when cold. The precipitated Valerianate of Iron is to be washed with a little Cold Water, and dried at a temperature not exceeding 68°. If too much water be used, or if the washing be continued the acid will be removed.

The Dublin Pharmacopœia of 1850, gives the following process for obtaining this salt: "Take of Valerianate of Soda *five ounces and three drachms;* Sulphate of Iron *four ounces*; Distilled Water *one pint.* Convert the Sulphate of Iron into a tersulphate of the sesquioxide (as directed in the formula for Prussian Blue), and add Distilled Water until the solution be augmented to the bulk of eight fluidounces. Dissolve the Valerianate of Soda in ten fluidounces of the Water, and mix the two solutions cold; then, having placed the precipitate which forms, upon a filter, and washed it with the remainder of the Water, dry it, by wrapping it in bibulous paper, and allowing it to stand on a porous brick for some days. When dried, it should be kept in well-stopped bottles."

In this process after having converted the Protosulphate of Iron into the Sesquisulphate, the Valerianate of Soda which is added, acts in the same manner as in the preceding method by Wittstein.

History.—The valerianate of sesquioxide of iron is a dark brick-red powder, not crystalline, smelling and tasting faintly of valerianic acid. Slowly heated, it gradually gives off all its acid without fusing; heated rapidly it melts and the acid is decomposed and volatilized. It does not mix with cold water even when rubbed with it; boiling water decomposes it, freeing valerianic acid, and leaving hydrated sesquioxide of iron. It dissolves in alcohol and acids. Its solution in hydrochloric acid, will, if too much of this acid has not been added, cause no blue color with ferrocyanuret of potassium.—*Witt.*

Properties and Uses.—Valerianate of Iron is a nervo-tonic, and will be found serviceable in nervous disorders, hysteria, chorea, neuralgia, chlorosis, and anemic conditions with excitability or irritability of the nervous system. The dose is one or two grains, in pill form, repeated three or four times a day.

INFUSA.

Infusions.

Infusions are solutions of vegetable principles in water, effected without boiling, and to which, when not contra-indicated, some kinds of spirit are occasionally added for the purpose of preserving them. The addition of any alcoholic mixture is, however, only made in cases where the medicinal action of the liquor itself is desired. The almost universal method of preparing infusions is to pour water at 212° F., on the materials, coarsely bruised or cut in small pieces, and then, covering the vessel containing them, allowing them to stand till the fluid becomes cold. If a long continuance of a low heat is required, the vessel containing the infusion is exposed to a water-bath, or to the necessary temperature by the side of a fire. Drugs containing volatile active constituents, or which are deteriorated by a temperature somewhat elevated, or which contain a principle not desired and which is not readily dissolved by water at a low degree of heat, are better made into infusions by cold instead of hot water.

Infusions form a very expeditious and convenient mode of exhibiting many medicines, as the most of them readily yield their active constituents in this way, without requiring to be very finely divided. The principal objection to them is the difficulty of keeping them for any length of time, in consequence of which they require to be prepared off-handed, and in limited quantity at a time. Mr. Alsop, however, has devised a plan by which they may be preserved for several months (*see page* 1999). The water employed in making infusions should be pure, and distilled water, rain water, or water free from earthy, saline and metallic principles may be used, and no other. Mugs containing a movable diaphragm, are now much in use for the preparation of infusions, and they are superior to any other mode. The diaphragm extends to one-third or one-half of the depth of the mug, and contains the vegetable remedy, while the jar is filled with hot or cold water as may be required. A constant circulation is kept up in the fluid by the increased density of the impregnated water carrying it to the bottom, while its place is occupied by the less impregnated fluid, and this continues until the remedy is exhausted of its active soluble principles.

In making infusions with boiling water, starch and other principles are often taken up, whose presence disposes to acidity or moldiness, or perhaps favors reactions which materially impair the infusions; on this account percolation by cold water is preferable, as it avoids these inconveniences, beside which these infusions have a less tendency to decay than those made at a boiling temperature. The process of percolation or displacement by cold water, affords infusions of very great strength, and is preferred to any other mode; it requires, however, that the articles should be more finely powdered, as a general thing, than is customary in preparing infusions in the ordinary way. When of too much strength, the infusion may be reduced by dilution with water.

The usual rule for preparing infusions is to add from half an ounce to an ounce of the coarsely bruised herb or root to a pint of water, of which, when prepared, the dose is from one to two fluidounces. They are better when prepared in glazed earthenware or porcelain vessels fitted with covers, than when prepared in metallic vessels, on account of a liability to chemical alteration from metallic influence, and which frequently impairs the preparation. Infusions containing acids, or saline substances should always be prepared and kept in glass or china vessels.

In the preparation of infusions, the reactions of agents should always be kept in view. Thus, infusion of *chamomile flowers* yields precipitates with nitrate of silver, sulphate of iron, gelatin, yellow Peruvian bark, tincture of chloride of iron, corrosive sublimate, and the acetates of lead.

—*Lond.* Infusion of *horseradish* undergoes rapid decomposition, and is precipitated with acetate of lead, infusion of galls, nitrate of silver, corrosive sublimate, and the alkaline carbonates.—*Lond.* Infusion of *cloves* is precipitated by the soluble salts of antimony, zinc, iron, silver, lead, and by lime-water.—*Phillips.* Infusion of *cascarilla* is precipitated by infusion of galls, acetates of lead, sulphates of zinc, and iron, nitrate of silver, and lime-water.—*Lond.* Infusion of *yellow Peruvian bark* is *incompatible* with potassa, soda, ammonia, and their carbonates, lime, magnesia, tannic and gallic acids, and vegetables containing these acids, tartaric acid, oxalic acid, and the soluble tartrates and oxalates. It also affords precipitates with other agents, which, however, do not always injure its efficacy or active principle, as corrosive sublimate, arsenious acid, tartar emetic, gelatinous solutions, soluble salts of iron, silver, and zinc, and many vegetable solutions, as those of cloves, chamomile, columbo, cascarilla, galls, horseradish, catechu, digitalis, senna, orange-peel, rhubarb, valerian, and simaruba.—*Lond.* Infusions of *senna*, *gentian*, *rhubarb*, and *columbo*, are better when made with cold water. When boiling water is added to *columbo* it takes up the starch, and the infusion spoils rapidly; it should be made with cold water, then boiled, and filtered to separate albuminous matter.—*Pharm. Jour. and Trans., vol. XIV.*, 1855, *pp.* 486, 438, 439, 403, 339. Infusion of *digitalis* is precipitated by acetate of lead, sulphate of iron, and infusion of cinchona.—*Lond.*

As nearly all vegetable medicines are occasionally administered in the form of infusion, it would be useless to enter into an especial relation of them, further than already explained in the above general rules; they are more commonly prescribed as secondary or auxiliary measures, and are left for the nurse or family to prepare. However, there are a few compound infusions, some of which are of a spirituous nature, which it may be advisable to describe on account of their extensive employment, and superior efficacy in the diseases for which they are recommended.

INFUSUM APII COMPOSITUM. *Compound Infusion of Parsley.*

Preparation.—Take of Parsley Roots and Seeds, coarsely bruised, Subcarbonate of Iron, each, *four ounces;* Horseradish Root, in small pieces, *two ounces;* Juniper Berries, Squill, White Mustard-seed, Mandrake Root, and Queen of the Meadow, of each, finely bruised, *one ounce;* Good Cider *six quarts.* Boil the Cider and pour it on the rest of the articles mixed together, in an earthen vessel; cover the vessel, and digest with a gentle heat for twenty-four hours.

The cider should not be hard, nor too new, but sparkling and pleasantly tart, and after digestion by heat, it should be allowed to remain upon the articles, without straining it off. By this course, the liquid becomes still further impregnated with the properties of the medicines.

Properties and Uses.—This is a most excellent preparation in several varieties of dropsy, for which alone it is used; it increases the action of the kidneys, regulates the bowels, improves the digestive functions, and promotes activity of the absorbent vessels. The dose is one or two fluidounces, three times a day. In the summer season, half the above quantity may be made at one time, as, otherwise it becomes very sour and moldy. It should always be used immediately after its preparation.—*J. K.*

INFUSUM EPIGÆÆ COMPOSITUM. *Compound Infusion of Trailing Arbutus. Diuretic Compound.*

Preparation.—Take of Trailing Arbutus, Queen of the Meadow Root, Dwarf-Elder Bark, Marsh-mallow Root, each, coarsely bruised, *half an ounce;* Boiling Water, good Holland Gin, of each, *one pint;* Honey *a sufficient quantity.* Pour the Boiling Water and Gin, on the plants, and digest them with gentle heat, in a close covered vessel, for six hours; then remove from the fire, strain, and add sufficient Honey to render it pleasantly sweet.

Properties and Uses.—This is a very valuable remedy in gravel, in chronic catarrh of the bladder, suppression of urine, high colored or scalding urine, inflammation of the urethra, and other disorders of the urinary organs. In oxalic deposits, however, it is of no utility. The dose is about two fluidounces, three or four times a day; in severe cases, this dose may be given every hour until relief is obtained, after which every three or four hours. In cases of gravel, a corresponding quantity of Wild-Carrot Root and Seed may be advantageously added to the articles.—*J. K.*

INFUSUM GERANII COMPOSITUM. *Compound Infusion of Cranesbill.*

Preparation.—Take of Cranesbill, Witch Hazel, Black Cohosh, and Golden Seal, each, coarsely bruised, *half an ounce;* Boiling Water *two pints.* Mix the articles together, and digest with a gentle heat, in a close vessel, for two hours; remove from the fire, and strain. If required, Alum *one drachm,* may be added.

Properties and Uses.—This forms an efficacious astringent wash in aphthous and other diseases of the mouth and throat, when unaccompanied with inflammation; and is also useful as an injection in leucorrhea, prolapsus ani, and prolapsus uteri.—*J. K.*

INFUSUM HYDRASTIS COMPOSITUM. *Compound Infusion of Golden Seal.*

Preparation.—Take of Golden Seal, Blue Cohosh, Witch Hazel, of each, in powder, *half an ounce;* Boiling Water *one pint;* pulverized Alum *one drachm;* Honey *a sufficient quantity.* Add the plants to the Boiling Water, and digest with a gentle heat, in a close vessel, for half an hour, remove from the fire, strain, add the Alum, and sufficient Honey to thoroughly sweeten the infusion.

Properties and Uses.—This infusion is very valuable as a wash or gargle in various forms of sore mouth, and ulcerated sore-throat.—*J. K.*

INFUSUM SALVIÆ COMPOSITUM. *Compound Infusion of Sage.*

Preparation.—Take of Sage Leaves, Hyssop Leaves, of each, *one ounce;*

Boiling Water *two pints;* pulverized Borax *one drachm.* Place the Herbs in the Boiling Water, allow them to digest for half an hour, then strain and add the Borax.

Properties and Uses.—This infusion is employed as a wash and gargle in aphthæ, sore-throat, and quinsy, when accompanied with inflammation.

LACTINATED PREPARATIONS.

These are new forms, in which active and powerful medicines are presented to the profession by the manufacturers, and are entirely distinct from those worthless articles whose mode of preparation is kept secret, and which, though containing large proportions of lactin, magnesia, etc., are sold at extravagant prices as the genuine unadulterated articles. The officinal lactinated preparations are composed of alcoholic extracts, essential or inspissated tinctures, and juices, resinoids, etc., thoroughly triturated with lactin or sugar of milk. They are said to be best formed in the process of mixture, by mixing the lactin with the medicine before it is dried, and then carefully drying and powdering them together. This combination of medicines with lactin has the advantage, 1st, of presenting many of the soft resinoids and inspissated tinctures, in the dry powdered form, without changing their chemical character, as is liable to be done by mixing them with alkalies or mineral substances. 2d. Of rendering them soluble, or at least readily miscible in water, and thus more easily administered, and more readily diffused in the stomach. 3rd. Of greatly increasing the activity of all the resinoids, and such other preparations as are but partially soluble in water. Four grains of such a mixture, although it contain only one grain of the medicine, will be generally found as active as two grains of the same medicine given in its isolated state, while at the same time it produces less irritation and other unpleasant effects. Many concentrated agents are much improved by this mode of combination, and are kept prepared in this way, as in their pure state they are so concentrated and insoluble as to act as irritants on the stomach before they can be sufficiently diffused and absorbed to produce their pathogenetic effects.

The lactinated medicines should be kept in ounce or two-ounce vials, with as little exposure to air and light as possible. All articles containing volatile principles, as the essential oils, soft resinoids, and oleo-resins, should be kept in half-ounce or ounce vials, as by frequently exposing them to the air they become inert. Those articles which absorb moisture from the air, and thus render the combination hard, or which require very large proportions of lactin to form a dry mixture, should not be lactinated.

Lactinated preparations are made of various proportions of lactin, and which are expressed on the label of the vials containing them; thus, there may be equal parts, each, of the medicine and the sugar of milk; or to one part of the former, there may be added two, five, or ten parts of the latter.

Ordinary cane sugar, saturated with concentrated alcoholic or etherea tinctures of various medicines, and then dried, has been used by medica men, and found very useful, but it will be found inferior to, and less permanent than a lactinated medicine, properly prepared.

LINIMENTA.

Liniments.

These preparations are designed for external application, and should always be of a consistence which will enable them to be applied to the skin by gentle rubbing with the naked hand, or flannel. They are usually composed of oily, spirituous, gummy, or saponaceous substances, are more fluid than ointments, denser than water, and at the ordinary heat of the body are always fluid. The benefit derived from them, depends either upon their counter-irritating influences, or from absorption of their active constituents. Liniments are usually prescribed extemporaneously by physicians, each having a preference; yet it is absolutely necessary that there be some established rule in relation to them, and that the officinal preparation be generally known.

LINIMENTUM ACONITI. *Linimentum Aconiti Radicis. Aconite Liniment.*

Preparation.—Take of Aconite Root, in powder, *four ounces;* Glycerin *two fluidrachms;* Alcohol *a sufficient quantity.* Macerate the Aconite with *half a pint* of Alcohol for twenty-four hours, then pack it in a small displacer, and add Alcohol gradually until a pint of tincture has passed. Distill off twelve fluidounces, and evaporate the residue until it measures twelve fluidrachms. To this add Alcohol *two fluidrachms,* and the Glycerin, and mix them.

This preparation is offered by W. Procter, jr., as a substitute for aconitia as an external anæsthetic application. It is twice the strength of the root, and is exceedingly active. The Glycerin is added for the purpose of retarding evaporation after application of the liniment to the skin, and which may be further secured by using oiled silk.

Properties and Uses.—This liniment may be used in all cases in which aconitia would prove useful, as in gout, neuralgia, and rheumatism. It is to be used as follows: Cut a piece of lint or muslin of the size and form of the part to be treated, lay it on a plate or waiter, and by means of a camel's-hair brush, saturate it with the *liniment.* Thus prepared it should be applied to the surface, a piece of oiled silk laid over and kept in place by an adhesive edge, or by a bandage. Care should be taken not to apply it to an abraded surface, and in its use the patient should be informed of its character, and avoid bringing it in contact with the eyes, nostrils, or lips.

LINIMENTUM ACONITI COMPOSITUM. *Compound Liniment of Aconite. Anodyne Pomade.*

Preparation.—Take of Glycerin, Hydrocyanic Acid, each, *one fluidrachm;* Aconitina *one grain.* Rub the Glycerin and Aconitina thoroughly together, and then add the Hydrocyanic Acid; when thoroughly mixed, put in a well-stopped vial.

In preparing this, care should be employed not to inhale any of the mixture, and after the addition of the hydrocyanic acid, the mixture should be bottled as quickly as possible.

Properties and Uses.—Anodyne; to be applied locally by means of a camel's-hair pencil over parts affected with neuralgia; when painted on the regions about the eye it will allay the pains incident to amaurosis.—*Prof. A. J. Howe.*

LINIMENTUM ACONITI ET CHLOROFORMI. *Aconite and Chloroform Liniment.*

Preparation.—Take of Castor-oil *two fluidrachms;* Chloroform, Water of Ammonia, Tincture of Aconite-Root, each, *two fluidrachms;* Camphorated Tincture of Soap *one fluidounce.* Mix them well together.

Properties and Uses.—This forms a liniment useful in rheumatic and neuralgic pains, and wherever such a combination is desired. If the solution above does not readily form a perfectly homogeneous mixture, a few moments' heating in a water-bath will effect it.—*W. Procter, jr.*

LINIMENTUM ÆRUGINIS. *Mel Ægypticum. Verdigris Liniment.*

Preparation.—Take of Verdigris (Subacetate of Copper), in powder, *one ounce;* Vinegar *seven fluidounces;* Honey *fourteen ounces.* Dissolve the Verdigris in the Vinegar, and strain through linen; then gradually add the Honey, and boil down to the proper consistence.—*Lond.*

Properties and Uses.—This is stimulant, detergent, and slightly escharotic. It is applied by means of a camel's-hair pencil to venereal ulcers of the throat, as well as to other indolent ulcers. Diluted with water it is employed as a gargle. By keeping, this preparation undergoes chemical change; the honey becomes colored, and its crystallizable sugar is converted into uncrystallizable saccharine matter, while the subacetate of copper is reduced to the form of minute granules of metallic copper.—*P.*

LINIMENTUM AMMONIÆ. *Liniment of Ammonia. Common or Volatile Liniment.*

Preparation.—Take of Solution of Ammonia *a fluidounce;* Olive Oil *two fluidounces.* Mix, and agitate them well together.—*Ed.*—*Lond.*

In this liniment a soap is formed by the union of the oil and ammonia, which is but imperfectly dissolved, and a white oleo-margarate of ammonia is formed with some glycerin.

Properties and Uses.—This preparation is used as a rubefacient in rheumatic and neuralgic pains, sore-throat, sprains, bruises, etc. It may be applied over the part on flannel, or the skin may be gently rubbed with it. If it becomes too active, it must be weakened with a sufficient quantity of oil.

LINIMENTUM AMMONIÆ COMPOSITUM. *Compound Liniment of Ammonia.*

Preparation.—" Take of Stronger Solution of Ammonia *five fluidounces;* Tincture of Camphor *two fluidounces;* Spirit of Rosemary *one fluidounce.* Mix them well together. This liniment may also be made weaker for some purposes with *three fluidounces* of Tincture of Camphor, and *two* of Spirit of Rosemary."—*Ed.*

This liniment, of the two strengths given, is a mere dilution of the stronger solution of ammonia, in two different degrees; the ammonia alone being too potent for use. It closely resembles Granville's Counter-irritant Lotion. The camphor and rosemary serve but little other purpose here than that of diluting agents.

Properties and Uses.—This liniment may be used to produce rubefaction, vesication, or cauterization. A piece of linen, six or seven times folded, or a piece of thick and coarse flannel impregnated with the liniment is to be applied to the part and covered with a thick towel, which is to be firmly pressed against the part; a very good plan is to select a box the size of the part to be acted upon, introduce patent lint into it, saturate it with the fluid, and hold it firmly upon the part. If rubefaction merely be desired, the application is continued for only six or eight minutes, or the weaker solution may be used; if vesication or cauterization be required, ten to fifteen minutes will be necessary. It is employed in painful and spasmodic affections, neuralgia, cramp, rheumatism, lumbago, swollen and painful affections of the joints, headache, sore-throat, sprains, etc.—*P.*

LINIMENTUM CAJUPUTI COMPOSITUM. *Compound Cajeput Liniment.*

Preparation.—Take of Oils of Sassafras, Cajeput, and Hemlock, each, *one ounce;* Soap *a sufficient quantity.* Mix them together and form a liniment.

Properties and Uses.—This forms a valuable stimulating and discutient application; it is principally used in indolent scrofulous tumors—*J. K.*

LINIMENTUM CALCIS. *Liniment of Lime.*

Preparation.—Take of Olive, or Linseed Oil, and Lime-water *equal parts.* Mix and agitate them together:—*Ed.*—*Lond.*

The oil and lime unite and form a calcareous soap, the oleo-margarate of lime, with some glycerin. It is called *Carron Oil.* Turpentine may be sometimes advantageously added to it.

Properties and Uses.—This is a very useful application to recent burns and scalds; it is best applied on carded cotton. The following is also reputed beneficial in burns; Take of Lime-water *two fluidounces;* Oil of Turpentine, Olive Oil, each, *one fluidounce.* Mix. If it be used immediately after the accident, add Oil of Pennyroyal *one fluidounce.*

LINIMENTUM CAMPHORÆ. *Camphor Liniment.*

Preparation.—Take of Camphor *an ounce and a half;* Chloroform *two fluidrachms;* Olive Oil *two fluidounces.* Dissolve the Camphor in the Oil and Chloroform mixed together.—*W. B. Price.*

Properties and Uses.—This forms a stimulant and anodyne application, in contusions, sprains, rheumatic, neuralgic, and other pains. In glandular enlargements it is used as a resolvent.

LINIMENTUM CAOUTCHOUCI. *Caoutchouc Liniment.*

Preparation.—Take of Caoutchouc, in fine pieces, *a convenient quantity;* Oil of Origanum *a sufficient quantity.* Dissolve the Caoutchouc in the Oil.

In this manner Caoutchouc may be dissolved in any of the stimulating essential oils. If the mixture be spread on paper, allowed to dry, and again spread, a valuable stimulating plaster may be had. A stimulating liniment was at one time much used by a certain class of practitioners, prepared as follows: Take of Caoutchouc, in small pieces, *four ounces;* Linseed Oil *one pint.* Mix together, and dissolve the Caoutchouc by means of a charcoal fire; then add Tallow *three-fourths of a pound;* Antispasmodic Tincture, Oil of Spearmint, of each, *two fluidounces;* Oils of Peppermint and Pennyroyal, of each, *one fluidounce.* This may be applied with much friction, or spread on a bladder.

Properties and Uses.—These preparations may be used whenever stimulating applications are desired. We give them here, because they are sometimes employed by physicians of various schools. Probably, the addition of Caoutchouc increases the non-conducting properties of these liniments.

LINIMENTUM CAPSICI COMPOSITUM. *Compound Capsicum Liniment.*

Preparation.—Take of Tincture of Capsicum *two fluidounces;* Tincture of Opium, and Aqua Ammoniæ, of each, *three fluidrachms;* Oil of Origanum, *two fluidrachms;* Oil of Cinnamon and Tincture of Camphor, of each, *one fluidrachm.* Mix.

Properties and Uses.—This is a very efficacious application in rheumatic, pleuritic, neuralgic, and other pains.

LINIMENTUM CROTONIS. *Croton-Oil Liniment.*

Preparation.—"Take of Croton Oil *one fluidounce;* Oil of Turpentine *seven fluidounces.* Mix together with agitation."—*Dub.*

Properties and Uses.—This acts as a prompt rubefacient; and when used for some time, produces pustulation. From ten to thirty minims may be placed upon a limited surface, and rubbed in; and when pustulation is required, this should be repeated two or more times every day.

LINIMENTUM NIGRUM. *Black Liniment.*

Preparation.—Take of Olive Oil *one fluidounce and a half;* Sulphuric Acid *one fluidrachm;* mix well together, and then add, Oil of Turpentine *half a fluidounce.*

Properties and Uses.—An active counter-irritant, but does not vesicate. To be rubbed on the part with a piece of lint, twice a day, until the skin becomes tender and inflamed. It may be used in indolent swellings of joints, rheumatic pains, and wherever active counter-irritation is indicated. —*Brodie.*

LINIMENTUM OLEI. *Liniment of Oils.*

Preparation.—Take of Oils of Cedar, Cajeput, Cloves, and Sassafras, of each, *one fluidounce.* Mix.

Properties and Uses.—This forms an efficacious application to rheumatic and other painful affections; it should be rubbed on the affected part, three or four times daily.

LINIMENTUM OLEI COMPOSITUM. *Compound Liniment of Oils. Concentrated Liniment.*

Preparation.—Take of Oils of Origanum, Hemlock, Cajeput, and Camphor, each, *four ounces*, by weight; Capsicum *two ounces.* Mix the Oils and dissolve the Camphor in the mixture; then add the Capsicum, and let it macerate for fourteen days, frequently agitating. Then filter.

Properties and Uses.—This is a powerful counter-irritant, and may be employed with advantage in indolent tumors, indurated mammæ, rheumatic and other pains, and to the spine, in epilepsy, nervous debility, etc. —*J. K.*

LINIMENTUM OPII. *Liniment of Opium. Anodyne Liniment.*

Preparation.—Take of Castile Soap *six ounces;* Opium *an ounce and a half;* Camphor *three ounces;* Oil of Rosemary *six fluidrachms;* Rectified Spirit *two pints.* Macerate the Soap and Opium in the Spirit for three days; filter, add the Oil and Camphor and agitate briskly.—*Ed.*

Properties and Uses.—This is an anodyne and mild rubefacient application in contusions, sprains, neuralgic and rheumatic pains, etc.

LINIMENTUM SAPONIS CAMPHORATUM. *Camphorated Soap Liniment. Opodeldoc.*

Preparation.—Take of Common White Soap *two ounces;* Camphor *one ounce;* Oil of Rosemary *three drachms;* Oil of Origanum *two drachms;* Aqua Ammonia F F F, *one ounce;* Alcohol *one pint and a half.* Place the Soap in the Alcohol, and digest on a sand-bath; when the Soap is dissolved, add the Ammonia, Oils and Camphor; agitate till they are dissolved, and immediately pour into wide-mouthed vials. When cold, this liniment becomes of a semi-solid consistence.

This liniment assumes an appearance of solidity, which is owing to its formation with a soap made with animal oil, instead of one with vegetable or olive oil. It is yellowish-white, translucent, and becomes fluid at the temperature of the body. Before cooling, it is usually placed in two or four ounce vials with wide mouths, and is known by the name of *Opodeldoc.* The formula above given, I consider to be much preferable to the one ordinarily followed in manufacturing the article.

Properties and Uses.—Camphorated Soap Liniment is an excellent anodyne embrocation in all local pains, rheumatism, contusions, sprains, sore-throat, etc.

LINIMENTUM STILLINGIÆ COMPOSITUM.—*Compound Liniment of Stillingia.*

Preparation.—Take of Oil of Stillingia *one fluidounce;* Oil of Cajeput *half a fluidounce;* Oil of Lobelia *two fluidrachms;* Alcohol *two fluidounces.* Mix together.

Properties and Uses.—This forms a peculiar kind of liniment, possessing stimulant and relaxant properties. It is used in chronic asthma, croup, epilepsy, chorea, etc. In asthma and croup, the throat, chest and neck is to be bathed with it, three or four times a day. In chorea, epilepsy, and spasmodic diseases, the whole vertebral column is to be bathed with it. In rheumatism, sprains, and painful affections, the diseased parts are to be bathed with it. In asthma its action is very prompt and effectual, relieving and ultimately curing the most obstinate cases. In the majority of instances, when applied to the chest, neck, etc., the patient experiences a peculiar taste in the mouth, somewhat resembling that of the Lobelia and Stillingia combined. It is often used of less strength, as—Take of Oil of Stillingia *half a fluidounce;* Oil of Cajeput *half a fluidounce;* Oil of Lobelia *one fluidrachm;* Alcohol *three fluidounces.* Mix. It is an agent peculiar to American practice, and is very active and efficacious.

LINIMENTUM SUCCINI COMPOSITUM. *Compound Liniment of Oil of Amber.*

Preparation.—Take of Oil of Stillingia, Rectified Oil of Amber, each, *one fluidounce;* Oil of Lobelia *three fluidrachms;* Olive Oil *two fluidounces.* Mix together.

Properties and Uses.—I have found this preparation very efficient in chronic asthma, croup, pertussis, chorea, epilepsy, rheumatism, sciatica, and various other spasmodic and painful affections; in many instances being much superior to the Compound Liniment of Stillingia. Its manner of application is the same as recommended for the preceding liniment. In very severe cases, it may be applied every hour, or half-hour, and continued until vomiting ensues. It acts as a stimulant, relaxant, and antispasmodic. In many of the above diseases it will effect a cure without the exhibition of any internal medicine; and is especially useful among children to whom it is difficult to administer remedies by mouth, or in cases where the stomach rejects all medicines. Care must be taken not to use too much of this liniment at any one application.—*J. K.*

LINIMENTUM TEREBINTHINÆ COMPOSITUM. *Compound Liniment of Turpentine. White Liniment.*

Preparation.—Take of Rose-water *two and a half fluidounces;* Yolk of Egg *one;* Oil of Turpentine *three fluidounces;* Oil of Lemon *half a fluidrachm;* Pyroligneous Acid (or in its absence Acetic Acid) *one fluid-*

ounce. To the Yolk slowly add the Rose-water, and rub together in a mortar; then add the Turpentine and Oil of Lemons. Pour the mixture into a pint bottle, and agitate to mix thoroughly; then add the Acid, and agitate quickly and briskly. It must be kept well corked.

Properties and Uses.—Used in asthma and inflammation of the lungs, rubbing it on the throat and chest with a sponge or cloth, from the epiglottic region to the epigastric; also useful wherever a counter-irritant is required.

LIQUORES.

Liquors or Solutions.

LIQUOR FERRI IODIDI. *Solution of Iodide of Iron. Syrup of Iodide of Iron.*

Preparation.—"Take of Iodine, dry, *two hundred grains;* fine Iron Wire, recently cleaned, *one hundred grains;* White Sugar, in powder, *four ounces and a half;* Distilled Water *six fluidounces*, Imp. meas. Boil the Iodine, Iron and Water together in a glass matrass, at first gently to avoid the expulsion of iodine vapor, afterward briskly, until about two fluidounces of liquid remain. Filter this quickly, while hot, into a matrass containing the Sugar; dissolve the Sugar with a gentle heat; and add Distilled Water, if necessary, to make up six fluidounces. Twelve minims contain one grain of Iodide of Iron."—*Ed.*

The addition of glycerin has been proposed to protect this salt in the earlier stages of the process. Dr. H. Thayer gives the following formula: Take of Iodine *one ounce;* Iron Wire *half an ounce;* Glycerin *one fluidrachm*; Distilled Water q. s.; White Sugar *six ounces.* Add the Glycerin to two fluidounces of Distilled Water contained in a suitable vessel, then add the Iodine and Iron. Agitate the vessel until reaction has taken place, and the solution acquires the proper greenish tint. Then filter, and finish the process as above, making twenty fluidounces of solution.—*Am. Jour. Pharm., XXX.*, 5.

By this process, the Solution of Iodide of Iron is preserved from decomposition by the addition of saccharine matter. In order to have a sufficiently strong solution containing the requisite amount of iodide of iron, the iodine should be dry. As the iron may be changed into the sesquioxide during filtration, by the action of atmospheric air, the excess of this metal ordered will tend to prevent such change. If the solution be made correctly, after its completion each fluidrachm will represent seven and one-fourth grains of the dry iodide.

In forming the solution, the iron is rapidly oxidated at the expense of the water, the hydrogen of which unites with the iodine to form hydriodic acid. This unites with the iron forming a hydriodate of protoxide of iron, or, according to some chemists, a solution of protiodide of iron. This solution, however, as with all solutions in which iron is united with one equivalent of oxygen or chlorine, is exceedingly subject to decomposition by exposure to air and light, in which the oxide of iron passes into a sesquioxide, forming a solution of the hydriodate of sesquioxide of iron. To obviate this tendency to sesquioxidation, M. Frederking of Riga, and Professor Procter of Philadelphia, proposed the addition of saccharine matter, which they found to exert a protective action, and which fact has since been amply confirmed by many eminent chemists. Hence, the sugar is added to protect the solution of iodide of protoxide of iron from becoming converted into one of the sesquioxide.

Solution of Iodide of Iron is a pale yellowish green, clear fluid, destitute of any precipitate. If the addition of starch changes it to a blue color, it is not perfect, but holds free iodine. Sulphuric acid added to it changes it to a brown color, with evolution of vapors on the application of heat, of a violet color.

Properties and Uses.—The medical properties are the same as mentioned under the head of *Iodide of Iron;* the dose is from ten to forty drops, three times a day. It should be well diluted with water, and care should be taken not to allow it to act on the teeth, by washing the mouth immediately after taking a dose.

LIQUOR FERRI NITRATIS. *Solution of Nitrate of Iron. Solution of Pernitrate of Iron. Solution of Ternitrate of Sesquioxide of Iron.*

Preparation.—"Take of fine Iron Wire, free from rust, and cut into small pieces, *one ounce;* pure Nitric Acid, sp. gr. 1.5, *three fluidounces;* Distilled Water *a sufficient quantity.* Dilute the Acid with sixteen ounces of the Water, introduce the Iron Wire, and leave them in contact until gas ceases to be disengaged. Filter the solution, and to it add as much Water as will make its bulk one pint and a half. The sp. gr. of this solution is 1.107."—*Dub.* The above fluid measures are Imperial.

Mr. Wm. Kerr introduced this preparation to the profession in 1832, (*Ed. Med. and Surg. Jour. XXXVII.*, 99.) When rightly made it is of a deep-red color, clear and powerfully astringent. On standing, sesquioxide of iron forms, which at first destroys the transparency of the liquid, but is finally deposited, and which may be prevented by the addition of a drachm of hydrochloric acid.

On account of the great liability to change in this preparation, various suggestions have been made for the purpose of procuring a permanent solution; among them is the following, offered by W. Procter, jr., of Philadelphia.—*Am. Jour. Pharm., N. S. XXIX.*, 306. Mix Nitric Acid, sp. gr. 1. 42, *three fluidounces* with Water *half a pint*, and add it gradually in small portions at a time to Iron Wire (card-teeth or small iron nails), *three ounces*, Troy, previously mixed with a pint of water, observing to moderate the reaction by setting the vessel in cold water. In this way the iron is protoxidized at the expense of the water, and hydrogen is evolved without the development of red fumes, which, when they occur, indicate a decomposition of a part of the Nitric Acid. When all the acid has been added, the solution should be repeatedly agitated with the excess of iron, until on filtering a portion it has a light green color, and affords a greenish-white precipitate with ammonia. It is now filtered into a half-gallon flask, and Nitric Acid, sp. gr. 1.42, *two fluidounces* added, which converts it, with violent effervescence and the escape of red nitrous vapors, into Ternitrate of Sesquioxide of Iron. The liquid should now be gently heated to deprive it of the absorbed gas, diluted until it measures three pints, and filtered through paper. It has a pale straw color, and a sp. gr. of 1.098, a strong astringent, acid taste, and is permanent. On the addition of ammonia it affords pure sesquioxide. In *Am. Jour. Pharm., N. S. XXIII.*, 315, W. W. D. Livermore offers the following formula for the preparation of a permanent solution of this ferruginous salt; it furnishes nearly the same result as obtained by Procter's method given above: Take of Sulphate of Iron *eight ounces;* Carbonate of Soda *ten ounces;* White Sugar *twenty ounces;* Nitric Acid, sp. gr. 1.42, *five fluidounces and five fluidrachms;* Boiling Water, Simple Syrup, of each, *a sufficient quantity*. Dissolve the Sulphate of Iron and Carbonate of Soda, each, in two pints of the Water, filter, and add to each solution two ounces of Simple Syrup. Mix the solutions, and allow the precipitate to subside. Pour off the supernatant liquid, and wash the precipitated carbonate carefully with sweetened Water, until the washings have no longer a saline taste. Collect the precipitate upon a fine muslin strainer, and with gentle pressure express as much of the Water as possible. Transfer to a porcelain capsule, and add gradually the Nitric Acid, previously diluted with an equal measure of Water. Mix the Sugar with the solution, and dissolve over a water-bath, stirring from time to time with a glass rod. When done, the syrup should be made to measure thirty fluidounces, by the addition of a sufficient quantity of Water. Each fluidrachm of this syrup contains ten grains of dry Nitrate of Iron, and the dose varies from twenty to forty drops. In *Am. Jour. Pharm., N. S., XXV.*, 97, Mr. Joseph Laidley, of Richmond, Va., has ascertained the formation of Oxalic Acid in the syrup of the Sesquinitrate of Iron, and considers it an unscientific and ineligible preparation; for, without an excess of Acid, it is a mixture of proto and pernitrate, and with that excess the Acid generates Oxalic Acid. He has found the solution of the protonitrate, as given by Prof. Procter, to keep perfectly well, even without the addition of the sugar, which, as the iron salt is already *per* oxidized, he considers of no use for preventing what would not occur, viz.: the further absorption of oxygen from the atmosphere.

Properties and Uses.—Solution of Nitrate of Iron is astringent, and possesses the property of diminishing tenderness and irritability of the mucous membranes with which it comes in contact. It has been found useful in chronic diarrhea, where intestinal ulceration is absent, and in the diarrhea of weak and nervous persons; it is contra-indicated if inflammatory symptoms are present. It has also been used in hematemesis, hemorrhage from the bowels, uterine hemorrhage and menorrhagia, especially in pale, feeble, and languid constitutions. It has also been found advantageous as an injection, and by mouth, in leucorrhea. In the colliquative diarrhea of tuberculous phthisis, it has afforded much benefit, as well as in chronic diarrhea and cholera-infantum of anemic or scrofulous patients. The dose is from ten drops to a fluidrachm, sufficiently diluted with water, and repeated three or four times a day; the ordinary dose is ten or twelve drops to commence with. Injected into the vagina, it will cause considerable irritation, unless previously weakened with water.

LIQUOR IODINI COMPOSITUS. *Compound Solution of Iodine.*

Preparation.—Take of Iodine *three drachms;* Iodide of Potassium *six drachms;* Rose-water *half a pint.* Add the Iodine and Iodide of Potassium to the Rose-water, and dissolve them with agitation. Distilled Water may be substituted for the Rose-water.

History.—Iodine is very slightly dissolved by water, but is extremely soluble in a solution of Iodide of Potassium. In preparing this solution two parts of the iodide are generally added with one of iodine, forming a concentrated solution of iodine, which is the active medicinal agent in the solution. The solution loses its strength by exposure to the air, in consequence of the evaporation of the iodine; light also appears to exert a deleterious influence upon it. It should, therefore, be kept in well-stopped bottles, and in a dark place.

Properties and Uses.—Compound solution of iodine possesses all the virtues of iodine, and may be used advantageously in scrofulous, syphilitic, and all tuberculous diseases, or wherever iodine is indicated. The dose is five drops in a tablespoonful of water, sweetened if desired, and gradually increased to twenty or thirty drops; the dose to be repeated three times a day. Twelve drops is equal to about half a grain of iodine.

LIQUOR MAGNESIÆ CITRATIS. *Solution of Citrate of Magnesia.*

Preparation.—Prof. E. S. Wayne gives the following formula for a superior *Solution of Citrate of Magnesia*, which does not give a precipitate on standing, if carefully prepared. Two solutions are first made, thus:

Solution No. 1.—Take of Carbonate of Soda *eight ounces and a half*, dissolve this in Tepid Water *two pints;* likewise dissolve in another vessel Sulphate of Magnesia *eight ounces*, in Tepid Water *two pints.* After the two solutions are perfected and clear, mix them in a convenient vessel, when a precipitate will take place. The precipitate, when completed, must be washed frequently until all traces of sulphate of soda are removed, which may be determined by adding baryta water to it. The hydrate of magnesia thus formed, is to be mixed with Clear Water *four fluidounces*, and the mixture charged with carbonic acid gas until all the hydrate is dissolved, and which will require a pressure of 100 or 110 pounds.

Solution No. 2.—Take of Citric Acid *eight ounces*, Calcined Magnesia *ten drachms*, Simple Syrup *two and a half pounds*, Tepid Water *two pints.*

Dissolve the Citric Acid in the Tepid Water, then add the Magnesia gradually until it is taken up and forms a clear solution, and then add the syrup.

To place in Bottles.—Take bottles of twelve fluidounces, each, fill them at first two-thirds with Solution No. 1, and then one-third with Solution No. 2, corking immediately. This forms a pleasant cooling purgative, operating without pain or griping. The dose is the contents of one bottle; one half of which, or six fluidounces, will prove gently laxative.

Citrate of Magnesia in powder is only slowly soluble in water, and does not readily make a clear solution, hence the liquid citrate is usually preferred. It has an acid taste, without any unpleasant bitterness, but is not permanent in its character, soon forming a deposit, which impairs its medicinal qualities, in consequence of which, it should be prepared only when wanted for immediate use. See M. E. Robiquet's process for a soluble citrate of magnesia, in *Am. Jour. Pharm. XXVII.*, 317.

Properties and Uses.—Solution of Citrate of Magnesia, is a pleasant, cooling purgative, acting mildly upon the bowels. The dose as a cathartic is about twelve fluidounces; as a laxative, six fluidounces.

LIQUOR POTASSÆ. *Solution of Potassa.*

Preparation.—"Take of dry Carbonate of Potassa *four ounces;* Lime, recently burnt, *two ounces;* Water *forty-five fluidounces*, Imperial measure. Let the lime be slacked, and converted into milk of lime, with seven fluidounces of water. Dissolve the carbonate in the remaining thirty-eight fluidounces of water; boil the solution, and add to it the milk of lime in successive portions, about an eighth at a time—boiling briskly for a few minutes after each addition. Pour the whole into a deep narrow glass vessel for twenty-four hours; and then, with a syphon, withdraw the clear liquid, which should amount to at least thirty-five fluidounces, and ought to have a density of 1.072."—*Ed.* The solution should be kept in green glass bottles, well stopped.

History.—Carbonate of potassa, in diluted solution readily yields up its acid to lime, which thus combined, precipitates as insoluble carbonate of lime. 865 parts of carbonate of potassa require only 463 parts of hydrate of lime; but the quantity of lime must be increased, as it is never entirely pure, and it also serves to keep the shape of the filter while straining the solution. There is no fear that lime will be found in the solution. The decomposition takes place also in the cold, but only after a longer period; in order that it may be complete, the solution must not be too concentrated, as in this case the lime will not abstract the carbonic acid, on the contrary, strong caustic potassa dispossesses carbonate of lime of its acid, becoming converted into carbonate of potassa. A silver vessel is the best to boil it in, otherwise a clean iron one may be used, but neither porcelain, copper, nor any other metal is applicable, from the action the potassa exerts on them. For the same reasons no wooden or porcelain stirrer should be used, and the strainer must be made of bleached linen. If all these things are attended to a colorless solution is obtained, which, when concentrated bears scarcely a yellow tinge. In testing the solution for carbonate of potassa, the precaution must be taken to pour the filtered solution into a large excess of acid, and not the acid to the solution, as in the latter case no gas is evolved until all of it has combined with the potassa to form bicarbonate. Lime-water, which is also one of the tests generally given for detecting carbonate of potassa in the solution, is inapplicable for the purpose, as in solutions perfectly free from carbonic acid it causes a precipitate of hydrate of lime. The best and quickest method of separating the carbonate and caustic lime is to strain it; by allowing it to settle and decanting the clear liquor a great deal of time is lost, which, from the avidity with which the solution absorbs carbonic acid, must be circumscribed as much as possible. With no other preparation are quickness and cleanliness in manipulation more requisite than with caustic potassa.—*Witt.*

Liquor Potassæ is a colorless fluid, having a feeble peculiar odor, and an excessively caustic corrosive taste. A brownish color is due to organic matter. It has a soap-like feel, and reddens yellow turmeric paper. It strongly attracts carbonic acid from the atmosphere, and should, therefore, be kept in closed vessels. It corrodes flint-glass, and should be preserved in green glass bottles. Pure Liquor Potassæ saturated with nitric acid, gives no precipitate with carbonate of soda, chloride of barium, or nitrate of silver; the first gives a precipitate when some earthy or metallic substance is present; the second gives a precipitate insoluble in nitric acid when a sulphate is present; and the third will occasion a precipitate soluble in ammonia, but insoluble in nitric acid, if a chloride is present. Solution of chloride of platinum forms a yellow precipitate with potassa. If on saturating the liquor with nitric acid, white flocculent matter separates it will be silicic acid; ammonia causes a white precipitate in the nitric solution if alumina is present; sulphocyanuret of potassium a red color, if iron is present; oxalate of ammonia forms a white precipitate if lime be present, and after filtering the liquor, magnesia may be detected by phosphate of ammonia. It is incompatible with salts of ammonia, acids, acidulous salts, calomel, bichloride of mercury, etc.

According to Dr. A. B. Garrod, Liquor Potassa destroys or renders inert the active principle of hyoscyamus, stramonium, belladonna, etc.; and other caustic alkalies produce similar results. The carbonates or bicarbonates of these alkalies have not the property of destroying the activity of the plants named.

Properties and Uses.—Liquor Potassæ is used as an antacid in conjunction with a bitter tonic infusion in acidity of the stomach. The solutions of the carbonates are, however, preferable as an antacid. It has also been recommended to remove the tendency to formation of uric acid in the urine, but is inferior to the carbonates, which may be used for a longer time, and without debilitating the stomach so soon as the Liquor Potassæ.

This fluid has been found useful as a resolvent in induration and enlargement of the lymphatic glands, and especially in excessive enlargement of the glandular papillæ at the end of the tongue. In scalding of the urethra accompanying gonorrhea, combined with ten or twelve drops of laudanum, Liquor Potassæ will be found to afford prompt relief. It has also been used in gout and rheumatism, attended with uric acid in the urine, to diminish the viscidity of the mucus in chronic bronchitis, and in some chronic skin diseases; externally it has been used as an application to ulcers, and in weak solution in some skin diseases. The dose is from five minims to half a drachm; it should be taken in some mucilage, or water sweetened, and be repeated two, three, or four times a day. When taken in quantities to injure the stomach, or in an undiluted state, the proper antidotes are acids which neutralize the alkali, as vinegar, or solutions of acetic or citric acid, and oil.

Off. Prep.—Potassa cum Calce.

LIQUOR POTASSÆ CITRATIS. *Solution of Citrate of Potassa. Neutral Mixture.*

Preparation.—Triturate Citric Acid *two drachms*, with Oil of Lemons *two minims*, and then with Water *four fluidounces;* when the solution is perfected, gradually add crystallized Bicarbonate of Potassa, until effervescence no longer takes place, and filter. This solution may also be made by saturating Lemon-juice with the Bicarbonate of Potassa, and filtering.

History.—In these formulæ the potassa of the alkaline salt is decomposed by the citric acid; carbonic acid is given off with effervescence, and citrate of potassa is formed by the combination of the citric acid and the alkali, which is held in solution with some free carbonic acid. When the acid is saturated by the alkali, the solution, after the carbonic acid has been allowed to pass off, will exert no action on blue or reddened litmus-paper. The two preparations are similar in medicinal virtue, the citric acid and lemon oil in the first process being intended to supply the absence of the lemon-juice. It is proper to filter, in order to remove foreign or undissolved substances.

Properties and Uses.—This solution is a refrigerant preparation, acting mildly on the skin, bowels, and kidneys. It is very useful in allaying gastric irritability. Its sedative and diaphoretic properties may be augmented by the addition of tincture of aconitum or of digitalis; its diuretic influence is rendered more certain by combining it with sweet spirit of nitre; and in diarrhea, or irritable bowels, some opium or morphia may be added to it. It forms a very grateful draught for fever patients, and may be sweetened with sugar, if needed. The dose is a tablespoonful diluted with about an equal measure of water, and repeated five or six times, or oftener, in the course of the day. A similar preparation may be given as an effervescent drink, by forming one solution of lemon-juice, and water, each, half a fluidounce; and another, by dissolving bicarbonate of potassa a drachm and a half in four fluidounces of water. The two solutions are to be mixed, and the whole taken as a draught during the effervescence.

LIQUOR SODÆ CHLORINATÆ. *Solution of Chlorinated Soda. Labarraque's Disinfecting Liquid.*

Preparation.—"Take of Carbonate of Soda *one pound;* Distilled Water *forty-eight fluidounces;* Chloride of Sodium *four ounces;* Binoxide of Manganese *three ounces;* Sulphuric Acid *two and a half fluidounces.* Dissolve the Carbonate of Soda in two pints of Water; then put the Chloride of Sodium and Binoxide of Manganese, rubbed to powder, into a retort; and add to them the Sulphuric Acid, previously mixed with three fluidounces of the Water, and cooled. Heat the mixture, and pass the Chlorine first through five fluidounces of the Water, and afterward into the solution of the Carbonate of Soda, above directed."—*Lond.*

The disinfecting power of this preparation was discovered by Labarraque about 1820. By the above process double decomposition occurs; hypochlorite of soda and chloride of sodium are formed in solution, while carbonate of lime is precipitated. It forms a clear, alkaline fluid, with a slight odor of chlorine. Its precise chemical nature is not fully determined.

Properties and Uses.—This solution, in large doses, is an irritant poison. In small doses it has been used as an antiseptic in all conditions of the system attended with great prostration, dry, brown-coated tongue, and offensive excretions, as in malignant fevers, exanthematous diseases, dysentery, putrid sore-throat, anthrax, gangrene, mercurial salivation, etc. It has also been used as a local application to remove fetor, check ulceration and sloughing, and in foul vaginal discharges; also in some diseases of the skin, as eczema, scald-head, prurigo, etc. Its dose is twenty drops or more, diluted with some mild aqueous liquid. Under the continued use of it, glandular enlargements and chronic mucous discharges have disappeared, and the secretion of urine is generally increased. When used externally it must be diluted with from five to thirty parts of water, according to the sensibility of the tissues or organs to be acted upon by it. In contagious or malignant diseases, it may be sprinkled around the rooms of the sick, as a disinfectant.

LOTIONES.

Lotions, or Washes.

These comprise all compounds used as external washes and collyria, in which vegetable or mineral substances are dissolved in water or spirits, but which do not strictly class with infusions, liniments, mixtures, or tinctures.

Glycerin has been proposed as a vehicle for forming lotions with salts o alkaloids, thus: 1. *Morphia Lotion*, Take of Acetate of Morphia *three* *grains;* Glycerin *five drachms* (Troy); dissolve. 2. *Strychnia Lotion,* Take of Sulphate of Strychnia *six grains;* Glycerin *five drachms* (Troy). Dissolve the Salt in the Glycerin in a porcelain mortar. A teaspoonful of this lotion is applied by friction in paralysis of the limbs, on the vertebral column in chorea, on the temples in certain cases of amaurosis. 3. *Veratria Lotion,* Take of Veratria *fifteen grains;* Glycerin *five drachms;* Diluted Hydrochloric Acid *a sufficient quantity.* Dissolve. A teaspoonful, applied by friction in chronic rheumatic pains of the joints, or in the sacro-lumbar region to relieve painful menstruation. 4. *Atropia Lotion,* Take of Atropia *six grains;* Glycerin, *two and a half drachms;* Diluted Muriatic acid *a sufficient quantity.* Dissolve and mix. Forty or fifty drops, three times a day, rubbed on the track of the sub and super-orbital nerves, on that of the facial nerve, etc.

Liquid preparations in which glycerin forms a large portion of the menstruum, are termed "*Glyceroles,*" as "Glycerole of Lactucarium," etc. (*See Ointments*).

LOTIO ALKALINA. *Alkaline Wash.*

Preparation.—Take of Carbonate of Soda (*Sal Soda*) *two drachms;* Warm Rain-Water *one quart.* Dissolve: or,

Make a weak Ley, by adding Hard-Wood Ashes to Hot Water.

Properties and Uses.—This wash is extensively and efficaciously employed by physicians, as an application to the surface of the body and limbs in all febrile and inflammatory diseases, and in chronic affections. In the former cases it is applied several times a day, especially when the acute symptoms run high; in the latter affections it is commonly used once or twice a week. The surface should always be well rubbed and dried immediately after each application. Frequently, when external stimulus is also required, the above proportion of water is lessened one-fourth or one-half, and the balance of the quantity made up by the addition of whisky or other spirit.

LOTIO ÆTHERIS COMPOSITA. *Compound Ethereal Lotion. Evaporating Lotion.*

Preparation.—Take of Sulphuric Ether, Rectified Alcohol, Solution of Acetate of Ammonia, each, *one ounce and a half;* Rose-water *three ounces and a half.* Mix together.

Properties and Uses.—This lotion may be used to produce a refrigerant or stimulant influence according to its mode of employment. Applied to surface and allowed to evaporate by free exposure, it acts as a *refrigerant;* but if the evaporation is prevented by covering the part to which it is applied with the hand or a cloth, it acts as a *stimulant.* The solution of acetate of ammonia, largely diluted (without the addition of ether or alcohol), is a superior cooling lotion in all cases of fever where there is a hot and dry state of the surface, often of itself inducing diaphoresis.

LOTIO AMMONIÆ HYDROCHLORAS. *Lotion of Hydrochlorate of Ammonia.*

Preparation.—Take of Hydrochlorate of Ammonia *two drachms;* Distilled water *one fluidounce*; Tincture of Poison Hemlock (Conium Mac.), *one fluidounce.* Dissolve the ammoniacal salt in the Water, and add the Tincture.—*Prof. C. H. Cleaveland.*

Properties and Uses.—This is sedative and resolvent, and is used as a local application to discuss tumors, etc. Its external use is sometimes associated with its internal exhibition.

LOTIO BORACIS. *Borax Lotion. Cooling Wash.*

Preparation.—Take of Borax, in powder, *two drachms;* Rose-water *half a pint.* Dissolve. In this preparation, Soft River-water may be substituted for Rose-water, when this latter can not be obtained.—*Beach's Am. Prac.*

Properties and Uses.—This forms a cooling application, and may be used in inflammation of the eyes, and inflammation or ulceration of the nipples, and of the mouth and fauces, as well as other irritated or inflamed mucous surfaces.

LOTIO BORACIS *cum* MORPHIÆ. *Borax Lotion with Morphia.*

Preparation.—Take of Borax, in powder, *half an ounce;* Sulphate of Morphia, *six grains;* Decoction of Golden Seal *eight fluidounces.* Dissolve the Borax and Morphia in the Decoction.

Properties and Uses.—This forms a cooling and mild anodyne wash, and may be used in inflammation of the eyes, sore and inflamed nipples, pruritus vulva, aphthous ulcerations of the mouth and fauces, and other irritated or inflamed mucous surfaces.

LOTIO GLYCERINI. *Glycerin Lotion.*

Preparation.—Take of Glycerin *half an ounce;* Distilled Water *half a pint.* Mix.

Properties and Uses.—This lotion has been recommended in eczema, lichen, and other cutaneous diseases; also as an application to the meatus externus in cases of deafness owing to a want of secretion of cerumen.

LOTIO HYDRASTIS COMPOSITA. *Compound Lotion of Golden Seal.*

Preparation.—Take of Strong Decoctions of Green Tea, and Golden Seal, each, *one pint;* Sulphate of Zinc, Gunpowder, dried Sulphate of Iron, of each, *two drachms.* Mix the decoctions, then add the remainder of the articles, and agitate briskly. After solution and decomposition have ceased, and the precipitate has subsided, pour off the supernatant liquid.

Properties and Uses.—This lotion is principally employed as a collyrium in chronic ophthalmic diseases, but it may be advantageously employed in all chronic affections of mucous surfaces, as an external application. The affected parts are to be bathed with it several times a day.

LOTIO HYDRASTIS ET ACONITI. *Lotion of Golden Seal and Aconite.*

Preparation.—Take of Golden Seal, in powder, *four drachms;* Boiling

Water *four fluidounces;* Tincture of Aconite *one fluidrachm.* Add the Golden Seal to the Water, and digest for three hours by a gentle heat; then filter and evaporate to two fluidounces, to which add the Tincture of Aconite.

Properties and Uses.—This forms a superior application to the eye in many cases of disease in that organ ; it may be applied by means of a camel's-hair pencil, or by dropping a minim or two on the eyeball. I have likewise found immense benefit in these cases, by substituting for the Tincture of Aconite, a *fluidrachm* or *two* of the Saturated Tincture of Black Cohosh. Some physicians employ Hydrastin in preparing the above formula, but as this is insoluble in water, it can effect but little influence. This preparation will also be found of service in chronic mucous difficulties, as vaginal leucorrhea, etc., used as a wash or injection.—*J. K.*

LOTIO JUGLANDIS. *Walnut Lotion.*

Preparation.—Take of Extract of green Walnut Shells *six grains ;* Distilled Water *fifty grains.* Mix and dissolve.

Properties and Uses.—This is recommended as an efficacious agent in enlargement of the tonsils, and is stated to be very prompt in its effects. It is applied to the parts by means of a camel's-hair pencil.

LOTIO LOBELIÆ COMPOSITA. *Compound Lobelia Lotion. Herpetic Wash.*

Preparation.—Take of Bayberry Bark, Lobelia Leaves and Seed, Yellow-Dock Root, each, in powder, *two drachms;* Vinegar *one pint.* Mix all together, and allow them to macerate for seven days, and filter; or make the lotion by displacement.

Properties and Uses.—This preparation forms an excellent local application to several species of cutaneous disease, also to erysipelas and erysipelatous inflammations. It is frequently prepared with Spirits instead of Vinegar, especially where more active stimulation is desired. In erysipelas half a pint of a saturated solution of Muriate of Ammonia, may be added to the above quantity with advantage.

LOTIO MYRRHÆ COMPOSITA. *Compound Myrrh Lotion.*

Preparation.—Take of Myrrh, in powder, *half an ounce;* Sulphate of Zinc, Acetate of Lead, each, *two drachms ;* Boiling Water *two pints.* Add the Myrrh and the Salts to the Water; let them macerate for seven days and filter.—*Beach's Am. Prac.* In the preparation of this lotion a decomposition necessarily ensues.

Properties and Uses.—Compound Myrrh Lotion is chiefly employed in cases of chronic ophthalmia; it will, however, be found useful in all chronic mucous diseases. It is usually applied three or four times a day and must not be used during the presence of inflammation. When too severe it may be diluted with water.

LOTIO REFRIGERANS. *Cooling Lotion. Saline Wash.*

Preparation.—Take of Fine Salt *half an ounce ;* Spirits, Vinegar and

Rain Water, each, *four fluidounces.* Mix the fluids, and then dissolve the Salt in them.—*Beach's Am. Prac.*

Properties and Uses.—This lotion is extensively employed as a cooling application in cases of pain or determination to the head, during fevers, inflammation of the brain, dropsy, etc. It is used cold or tepid, according to the benefit received from its application at these temperatures.

LOTIO SASSAFRAS. *Sassafras Lotion.*

Preparation.—Take of Pith of Sassafras *one drachm;* Rose-water *a pint.* Mix, let them stand for four hours, and filter.—*Beach's Am. Prac.* Distilled Water may be substituted for the Rose-water, and the preparation may be made more speedily by boiling the mixture for a few minutes.

Properties and Uses.—This is an extemporaneous preparation, and is principally used in acute ophthalmia. A similar preparation of Marsh-Mallow Root, Elm Bark, or Buckhorn Brake, will be found equally available.

LOTIO SODII COMPOSITA. *Compound Soda Lotion.*

Preparation.—Take of Rock Salt *three ounces;* Sulphate of Zinc *one ounce;* Red Oxide of Iron (Sesquicarbonate) *eight grains;* Rain Water or clear River Water *one pint.* Add the articles together, and form a solution; and when the precipitate formed has subsided pour off the supernatant liquid.

Properties and Uses.—Used as a stimulating collyrium in chronic ophthalmic diseases.

LOTIO ZINCI COMPOSITA. *Compound Lotion of Zinc.*

Preparation.—Take of Sulphate of Zinc, Rock Alum, each, *one scruple;* Distilled Water *two pints.* Mix, and when dissolved, filter.

Properties and Uses.—This lotion is used as a stimulating application to the eye in cases of films, specks, opacities, etc.; to abnormal growths on mucous surfaces; to indolent ulcers with fungous growths; and to gangrene.

MISTURÆ.

Mixtures.

By Mixtures is meant all those preparations containing Oleaginous, Mucilaginous, Albuminous, or Saccharine Substances, which are used internally, and can not properly be classed with infusions, decoctions, syrups, tinctures, etc.; also compounds in which Insoluble Substances, whether liquid or solid, are suspended in aqueous fluids by the intervention of some viscid matter.

MISTURA CAMPHORÆ COMPOSITA. *Compound Mixture of Camphor.*

Preparation.—Take of Camphor Water, Peppermint Water, and Spearmint Water, each, *one fluidounce;* Camphorated Tincture of Opium *two fluidrachms.* Mix together.

Properties and Uses.—This is a very efficacious agent in allaying nausea and vomiting. It was extensively and successfully employed in Cincinnati in the nausea and vomiting attending Asiatic cholera. It possesses the virtues of the several articles entering into its composition, without the stimulating influence of the alcohol, which enters into their tinctures, upon already partially inflamed mucous surfaces. The dose is from a teaspoonful to a tablespoonful every five minutes, if the patient be vomiting, and every ten minutes if he be only nauseated.

MISTURA CAJUPUTI COMPOSITA. *Compound Cajeput Mixture. Hunn's Drops.*

Preparation.—Take of Oils of Cajeput, Cloves, Peppermint, and Anise, each, *one fluidounce;* Rectified Alcohol *four ounces.* Dissolve the Oils in the Alcohol.

Properties and Uses.—This is a very valuable stimulant and antispasmodic preparation, and has been successfully used in colic, cramp of the stomach, or elsewhere, flatulence, pains in the stomach or bowels, painful diarrhea, cholera-morbus, Asiatic cholera, and in all cases where stimulant and antispasmodic action is desired. During the cholera of 1849–50–51, it was extensively used in Cincinnati for the purpose of overcoming violent spasmodic action, in the doses of one or two fluidrachms, every ten or fifteen minutes; one or two doses generally succeeded in relieving the pains and spasms when all other means had failed. The ordinary dose is from ten drops to half a fluidrachm. It should be given in simple syrup, mucilage of slippery-elm, or in hot brandy and water sweetened. Care should be taken not to introduce too much of this preparation into the stomach at any one time, as a large proportion of it would produce inflammation of the stomach. It is a very valuable agent, when properly used, and should always be kept by every physician and druggist.

MISTURA CHENOPODII COMPOSITA. *Compound Wormseed Mixture. Worm Mixture.*

Preparation.—Take of Castor-oil *one fluidounce;* Wormseed Oil, Anise Oil, and Tincture of Myrrh, of each, *one fluidrachm.* Mix.—*Beach's Am. Prac.*

Properties and Uses.—This is an excellent vermifuge, and may be used in doses of one teaspoonful for an adult, to be repeated three or four times a day, and after having been taken for three successive days, to be followed by a cathartic. This somewhat resembles "Fahnestock's Vermifuge," which is said to be composed of, Castor-oil *one fluidounce;* Oil of Wormseed *one fluidounce;* Oil of Anise *half a fluidounce;* Tincture of Myrrh *half a fluidrachm;* Oil of Turpentine *ten minims;* Croton Oil *one minim.* Mix. The dose is a teaspoonful for an adult, every two hours, to be continued for ten or twelve hours.

MISTURA COPAIBÆ COMPOSITA. *Compound Copaiba Mixture. Diuretic Drops.*

Preparation.—Take of Spirit of Nitric Ether and Oil of Almonds, each, *one fluidounce;* Copaiba, and Oil of Turpentine, of each, *half a fluidounce;* Camphor, in powder, *ten grains.* Mix together the liquids, then add the Camphor, and agitate briskly.—*Beach's Am. Prac.*

Properties and Uses.—This forms a diuretic mixture, which has been successfully and extensively used in gonorrhea, gleet, scalding of urine, and urinary affections. The dose is one fluidrachm, three times a day, in some tea or mucilage. It should be well agitated previous to taking it. There are various mixtures of Copaiba in use for the cure of gonorrhea, and as several of them have been found efficacious, I give the formula for preparing them:

1. Take of Copaiba, Spirit of Nitric Ether, Compound Spirits of Lavender, Tincture of Muriate of Iron, of each, *one fluidounce.* Mix. The dose is a teaspoonful three times a day.

2. Take of Oil of Cubebs, Oil of Anise, Copaiba, Tincture of Opium, Tincture of Muriate of Iron, of each, *one fluidounce.* Mix. The dose is a teaspoonful three times a day. The two preparations above are very disagreeable to the taste, but very efficacious in gonorrhea, after the active symptoms have subsided. They must be agitated thoroughly previous to taking each dose, and in order to protect the teeth from the injurious action of the acid in the Tincture of Muriate of Iron, it is recommended to rinse the mouth immediately after taking each dose, with a solution of bicarbonate of potassa.

3. Take of Solidified Copaiba *two ounces;* White Wax *one ounce;* Oil of Cubebs, Oil of Spearmint, of each, *one fluidrachm;* Nitre, finely pulverized, *two drachms.* Melt the Wax, add the Oils, and then the Copaiba; stir all well together, and finally, add the Nitre. This forms a paste much used for the cure of gonorrhea. The dose is a quantity about the size of a small chestnut, three times a day.

4. Take of Alum, in powder, *one drachm;* Precipitated Carbonate of Iron *half an ounce;* Pulverized Cubebs *one ounce;* Copaiba *a sufficient quantity* to form a kind of paste. The dose is the same as in the preceding preparation.

MISTURA GLYCYRRHIZÆ COMPOSITA. *Compound Liquorice Mixture.*

Preparation.—Take of powdered Extract of Liquorice, powdered Gum Arabic, and White Sugar, each, *two drachms;* triturate these with Water *six fluidounces*, added to them gradually, and when these are dissolved, strain the solution, and add to it Camphorated Tincture of Opium *one fluidounce*, Tincture of Bloodroot *half a fluidounce*, Spirit of Nitric Ether *two fluidrachms.*

Properties and Uses.—This forms an excellent cough mixture, and may be used in catarrhal affections, after the subsidence of the more active symptoms, and when expectoration is present. An adult may take half a fluidounce for a dose, and a child three or four years old a fluidrachm. A very excellent cough drop may be made as follows: Dissolve Hydrochlorate of Ammonia *two drachms* in Water *six fluidounces*, then add Extract of Liquorice *two drachms*, Extract of Hyoscyamus *half a drachm;* when these are dissolved, add Syrup of Tolu *one fluidounce.* The dose is the same as the above, and may be repeated three or four times a day. A grain or two of the Sulphate of Sanguinarin may be added to render it more expectorant.

MISTURA OLEI CAMPHORATA. *Camphorated Mixture of Oils.*

Preparation.—Take of the Oils of Cloves, Cajeput and Amber (rectified), and Camphor, each, *half an ounce.* Mix the Oils together, and dissolve the Camphor in the mixture.

Properties and Uses.--This is intended for the relief of toothache. The decayed portion of the tooth is to be cleansed and dried, and then a few drops of the mixture on cotton applied to the part; continue the application two or three times in the same manner, and leave the last in the tooth. This has proved very efficacious, and has been extensively sold throughout the country as "Parisen's Vegetable Specific."

It will not be amiss to give, at this place, another preparation for toothache, which I have found of service. Take of Opium, and Nitre, each, *two ounces;* Camphor *an ounce and a half;* Galls, in powder, *four ounces;* Alcohol *a pint and a half.* Place the articles in the Alcohol, macerate for fourteen days, and filter. To be applied the same as with the preceding mixture. Various other agents, as Solution of Tannic Acid, or Gallic Acid in Alcohol, etc., have been recommended for relieving toothache, but the above will be found to answer the purpose admirably. (*See Carvacrol.*)

MISTURA OLEI COMPOSITA. *Compound Mixture of Oils. Vermifuge Oil.*

Preparation.—Take of Castor-oil, and Wormseed Oil, each, *one ounce;* Oil of Turpentine, and Oil of Anise, of each, *half an ounce.* Mix together.

Properties and Uses.—This forms an efficacious remedy for worms, and may be given in teaspoonful doses to an adult, and repeated every two hours. After its employment for two or three days, a purgative must be administered.—*T. V. M.*

MISTURA SANGUINARIÆ COMPOSITA. *Compound Mixture of Bloodroot. Cough Drops.*

Preparation.—Take of Syrup of Ipecacuanha, Syrup of Squill, Tincture of Bloodroot, Syrup of Balsam Tolu, Camphorated Tincture of Opium, each, *one ounce.* Mix together.—*J. K.*

Properties and Uses.—This is a very efficacious preparation in severe cough from colds, catarrhal or bronchial irritations. The dose is from half a fluidrachm to a fluidrachm whenever the fit of coughing is severe. I have used it for many years in practice, with much benefit. A very pleasant preparation for cough is composed of Oil of Anise, Oil of Sweet Almonds, Tincture of Balsam Tolu, Canada Balsam, Madeira Wine, each, *one ounce.* Mix.—*Beach's Am. Prac.* The dose is from ten to twenty drops, three or four times a day, in a little elm or flaxseed infusion. It assists expectoration, and affords great relief in tickling coughs.

MISTURA SPIRITUS VINI GALLICI. *Brandy Mixture.*

Preparation.—Take of Brandy, Cinnamon Water, each, *four fluidounces;* the yolks of *two* Eggs; Refined Sugar *half an ounce;* Oil of Cinnamon *two minims.* Mix together.—*Lond.*

Properties and Uses.—This forms a nutritive and stimulating preparation, especially adapted to the stage of prostration in low forms of fever, and in cases of much debility from various other causes.

MORPHIA.

Compounds of Morphia.

MORPHIA. *Morphia.*

Preparation.—"Take of Turkey Opium, cut into thin slices, *a pound;* Distilled Water *six pints;* Chloride of Calcium *six drachms;* Prepared Animal Charcoal *as much as is sufficient.* Macerate the Opium for twenty-four hours with two pints of the Water, and decant. Macerate the residuum for twelve hours with another two pints of the Water, decant, and repeat this process with the rest of the Water, subjecting the insoluble residuum to strong expression. Let the decanted solutions and expressed liquor be evaporated by a steam or water heat to the bulk of one pint, and then passed through a calico filter. Pour in now the Chloride of Calcium, first dissolved in four fluidounces of Distilled Water; and then proceed with the evaporation until the solution is so far concentrated, that upon cooling nearly the whole of it becomes solid. Let this solid matter be enveloped in a couple of folds of strong calico, and subjected to powerful pressure, the dark liquid which exudes being reserved for subsequent use. The squeezed cake is now to be acted on with about half a pint of boiling water, and the whole being thrown upon a paper filter, the precipitate must be well washed. The filtered solution having been evaporated as before, cooled and solidified, the residue is to be again subjected to expression. If the product be not quite white, this process should be repeated a third time, the liquid forced out during expression being always preserved. Let the squeezed cake be dissolved in six fluidounces of boiling water, and, if necessary, cleared by filtration through Prepared Animal Charcoal, the portion of it soaked by the filter being carefully washed out of it; and to the solution thus obtained, let Water of Ammonia be added, in slight excess, and let the crystalline precipitate which forms when the liquor has cooled be collected on a paper filter, and washed with cold Distilled Water until the washings cease to give a precipitate upon being dropped into an acid solution of nitrate of silver. Lastly, let the filter be transferred to a porous brick, in order that the Morphia it contains may become dry.

"The liquids separated by expression from the Muriate of Morphia, in the preceding process, having been diluted with water, so as to occupy the bulk of four fluidounces, and then supersaturated slightly with Ammonia, let the precipitate which forms be collected, after the lapse of six hours, on a filter, and washed with a little cold water. This, if redissolved in dilute muriatic acid, boiled with a little animal charcoal, and filtered, will upon cooling, afford a crystalline deposit, from which, when pressed, dissolved in water, and supersaturated with Ammonia, an additional quantity of Morphia will be procured."—*Dub.* The above weights are avoirdupois, and the measures Imperial.

"Take of Hydrochlorate of Morphia *one ounce*: Solution of Ammonia *five fluidrachms*; Distilled Water *a pint*, Imperial measure. Add the Hydrochlorate of Morphia, first dissolved in a pint of Water, to the solution of Ammonia with an ounce of Water, shaking them together. Wash the precipitated Morphia with Distilled Water, and dry it with a gentle heat."—*Lond.*

The first and principle condition of success in the preparation of Morphia consists in the selection of a good sort of opium. Although it may be averred as a general fact that the soft opium of Smyrna is very rich in Morphia, yet too much faith should not be reposed in the mere outward appearance of the article. The best and safest way is to ascertain, by actual experiment, the proportion of Morphia present in a given sample of opium. This is done most accurately by the ordinary process of extracting Morphia. M. Couerbe, however, recommends the following process on account of the greater rapidity of its execution:—

Prepare an infusion (or rather maceration) of the opium in the usual way, add to this lime in excess, and heat for a few seconds; strain; the whole of the Morphia will be found in the strained liquid; acidulate the latter, and precipitate with ammonia. This will give the Morphia almost white, and free from admixture or narcotina.

History.—When opium is reduced to a coarsely powdered condition, and is properly worked by hand in water, its Morphia is extracted by this fluid. Working it thus several times in fresh portions of water, with a lengthened maceration, will remove nearly if not all the Morphia with its combined acid in the drug. These several infusions are then added together, and concentrated by evaporation. Solution of ammonia being now mixed in with the concentrated infusion, it decomposes the salt of Morphia, precipitating the alkaloid, and at the same time combining with its acid to form a salt (meconate of ammonia). The alcohol is added to dissolve coloring matter as soon as the Morphia is separated from its acid, and thus prevents this coloring matter from being deposited with the alkaloid. By introducing the ammonia in portions at two different periods of the process, the Morphia is not so rapidly set free, and consequently the alcohol can take up nearly, if not quite all, of the coloring matter, and other impurities soluble in this liquid. If too much ammonia be added, it will dissolve the Morphia; and this must be guarded against. The impure yellowish crystals of Morphia obtained are purified by the subsequent boiling in alcohol, and filtration through animal charcoal. In this process alcohol of sp. gr. 0.9032 is better than highly rectified alcohol which is apt to dissolve some of the Morphia. The ammonia used should be of the officinal standard. Any Morphia which may be held by the alcohol, may be procured by distilling this liquid, and, when properly concentrated, purifying it by a similar operation.

Morphia, as ordinarily procured, is apt to contain a portion of narcotina, which may be removed by ether in which the latter alkaloid is soluble, but not the former. Or, diluted acetic acid may be used in which only the Morphia is soluble; the solution may then be filtered, and the Morphia precipitated by ammonia. Or, diluted muriatic acid may be employed; this dissolves both the Morphia and narcotina, the latter is thrown down by adding lime and boiling the mixture; then upon filtration and adding ammonia to the filtrate the Morphia is precipitated.

Morphia is procured by other processes beside those given above. Wittstein says:—After trying several of the methods which appeared to me most advantageous, I can recommend that of Mohr's as the best, according to my experience. Twenty parts of good opium is cut into slices and boiled, in a copper or leaden vessel, with sixty parts of water, being constantly stirred with a wooden spatula, for half an hour, or until all the slices are entirely softened, strain through a pointed bag of rather coarse linen, press the residue, and treat it twice with fresh water in the same way. The strained liquor is to be evaporated in the same vessel to half its bulk; forty parts of water, containing five parts of hydrate of lime, are then heated to boiling, and the condensed liquid gradually added to it; the whole is then boiled for a quarter of an hour, strained, pressed, and the residue twice boiled, each time with fifty parts of water. The mixed fluids containing lime are concentrated to forty parts and filtered. The filtrate is heated in a porcelain dish to boiling, two parts of muriate of ammonia are added, and the whole allowed to stand in a warm place, with frequent stirring, for one hour, or until an evident evolution of ammonia takes place, then removed to a cold one. After standing eight days the brown crystalline precipitate that has separated is collected on a strainer, the liquid which passes off evaporated to half, and this again allowed to stand eight days in a cool place, strained, pressed, the mother-liquor thrown away, and the two residues mixed. To the two precipitates, after washing them with cold water, so much water is added that the whole weighs about twenty parts, then add pure hydrochloric acid until the liquid acquires a feebly acid reaction; it is now heated to boiling, filtered while hot, and evaporated to a small bulk. After it has stood some days, the crystalline mass which forms is collected on linen, strongly pressed, again evaporated and strained: this last black mother-liquor may be kept for mixing with the opium at another preparation of Morphia. The crystallized and dried mass is dissolved in four times its weight of boiling water, and the solution added to a boiling mixture of three parts hydrate of lime and twenty-four parts water; the straining, washing, treating with sal ammoniac (one and a half pints), and hydrochloric acid are repeated as before, the precipitate dissolved in thirty times its weight of hot water, and the solution, if colored, treated with freshly heated wood charcoal; when cold it is precipitated with ammonia, of which too large an excess must be avoided. The precipitated white crystalline needles are collected on a filter, rinsed with cold water, and dried with a gentle heat. The product will be one-tenth or one-twelfth of the weight of opium used. The precipitate which ammonia causes in the preparation of meconic acid is dissolved in dilute hydrochloric acid, and treated exactly like the watery solution of opium.

Water dissolves the salts of Morphia, codeiæ, thebain, and the greater portion of narcotina; the codeia and thebain, on account of the little contained, can only be isolated when operating on large quantities of opium. When the watery solution comes in contact with the boiling milk of lime, the acids pass to the lime, forming meconate and sulphate of lime, the alkaloids precipitate, but the Morphia redissolves in the lime-water, the others remaining in the residue, from which narcotina, codeia, and thebain may be extracted with alcohol or ether. For convenience sake the lime solution is evaporated, and during this process, from the access of the carbonic acid in the atmosphere, a portion of the lime precipitates as carbonate, and with it the Morphia that it had previously held in solution, this is only trifling, yet quite sufficient to repay (when a good quantity has been collected) for its exhaustion with alcohol. When sal ammoniac is added to the condensed and filtered solution, both compounds are decomposed; the oxygen of the lime forms water with one atom of hydrogen of the ammonium, the calcium combining with the chlorine, ammonia is evolved, and the Morphia, robbed of its solvent, precipitates with some coloring matter. In order to insure entire decomposition heat must be employed, and afterward the whole is allowed quietly to rest for several days. The mother-liquor, when further evaporated, yields a little more Morphia. The quantity of sal ammoniac mentioned is more than sufficient to throw down all the Morphia, but the excess is of no ill-consequence, and insures entire precipitation. In order to purify this Morphia further from coloring matter, it must be combined with some acid with which it forms a readily-crystallizable and not very soluble salt; for this purpose hydrochloric acid answers best. Most of the coloring matter, with a little hydrochlorate of Morphia, remains in the mother-liquor, and what still adheres to the salt will be entirely removed by the second treatment with lime, etc. The Muriate of Morphia obtained the second time forms with water only a slightly colored solution, which is rendered perfectly colorless by shaking with freshly prepared charcoal, and on the addition of caustic ammonia precipitates as fine white needles, of a silky luster. An excess of ammonia is to be avoided, as the Morphia will be redissolved by it. If wished for in large crystals, it is dissolved in strong alcohol, and the solution slowly evaporated. It is sometimes possible to decolorize the first Muriate of Morphia entirely with charcoal, and thus render the treatment with lime unnecessary; it is well to try this with a small portion first.

The precipitate obtained by evaporating the Morphia and lime solution is dried, exhausted with strong alcohol, the solution concentrated, taken up with hydrochloric acid, and the salt either purified alone or used up with a fresh precipitate from opium.

Pure Morphia forms fine white needles of a silky luster, and, if obtained from an alcoholic solution, by slow evaporation, in tolerably large, colorless, semi-transparent, four-sided prisms. It is odorless, and tastes distinctly bitter. It undergoes no change in the atmosphere. Carefully heated it gives off water, fusing to a yellow liquid, which still more strongly heated decomposes, burning and leaving a carbonaceous residue, which heated long enough must be entirely consumed. Water dissolves but a trace of Morphia, but acquires a bitter taste from it. It is insoluble in ether. Boiling water dissolves about one hundreth of Morphia. Alcohol of 80 per cent. dissolves, at the ordinary temperature, one-thirtieth; and boiling alcohol one-twentieth of its weight of Morphia, the solution having an alkaline reaction. It is soluble in dilute acetic, hydrochloric, nitric, and sulphuric acids, also in the fixed and volatile oils, in solutions of potassa and of soda, also in small quantity, of ammonia, and in solutions of caustic baryta, lime and strontia. It is precipitated from its alkaline solutions, when exposed to the atmosphere, on account of the alkalies combining with the carbonic acid to form carbonates. Nitric acid reddens morphia or its salts, which becomes yellow after a little time. Iodic acid is deoxidized by it, free iodine being liberated. Tincture of galls gives, with neutral solutions, a dirty white precipitate of tannate of Morphia, which is dissolved by acetic acid. Sesquisalts of iron, give with Morphia and its salts, a deep blue color, which is dissipated by heating. A solution of the terchloride of gold forms with Morphia or its salts a yellow precipitate; if after shaking this up well, a drop of liquor potassa be added, the solution assumes various hues, first greenish, then bluish, then violet, and finally purple. If, on shaking with ether and evaporating, a crystalline residue is left, narcotina is present. The nitric acid or dilute acetic acid solution must give no precipitate with nitrate of silver, nitrate of baryta, oxalate of ammonia, or phosphate of ammonia, which denote the presence of hydrochloric and sulphuric acids, lime, and magnesia. If oxalate of lime gives a precipitate it must be removed previously to testing for magnesia. Morphia has the formula $C_{35}H_{20}NO_6$; its symbol is $\overset{+}{\mathrm{M}}$, and its equivalent weight 292.—*Witt.* and *P.*

Properties and Uses.—Morphia possesses essentially all the actions of opium, and is the principle in that drug to which its narcotic, anodyne, sedative, and diaphoretic properties are due. But as it is not so soluble as its salts, these are usually employed; the principal ones are the sulphate, muriate, and acetate. Pereira says that in comparing the morphitic salts with opium, we observe that they are less stimulant, and less disposed to cause sweating, constipation, headache, and dryness of the tongue; the feelings which they excite are less agreeable, and hence they are not adapted to be substituted for opium by the eaters of this drug; they more readily affect the bladder than opium. The salts of Morphia are used wherever it is desired to obtain the ordinary medicinal influences of opium, and they are preferred to opium when applied endermically to alleviate severe pain of a neuralgic character, gastrodynia, obstinate vomiting, to relieve the excessive endermic operation of strychnia, etc., opium is best adapted in the prostrating stage of typhus and typhoid fevers, as a stimulant, and to check unhealthy discharges. Given in large nonmedicinal doses Morphia, as well as its salts, is a powerful narcotic poison, producing symptoms similar to those caused by opium, as dimness of sight, excessive weakness, loss of consciousness, contracted pupils, sometimes dilated, with coma, coldness of the surface, frequent and small pulse, hurried stertorous respiration, and occasionally convulsions. There may also be difficult micturition, itching, and a livid appearance of the skin. The treatment will be the same as that named for poisonous doses of opium.

The dose of Morphia and its salts, is from one-eighth of a grain to a quarter; and one-sixth of a grain represents about a grain of ordinary opium.

Off. Prep.—Morphiæ Acetas; Morphiæ Murias; Morphiæ Sulphas; Ferri et Morphiæ Tartras; Quiniæ et Morphiæ tartras.

MORPHIÆ ACETAS. *Acetate of Morphia.*

Preparation.—"Take of Morphia *six drachms;* Acetic Acid *three fluidrachms*; Distilled Water *four fluidounces*, Imp. meas. Mix the Acid with the Water, and pour them upon the Morphia to saturation. Let the liquor evaporate with a gentle heat, that crystals may be formed."—*Lond.*

Wittstein's process is,—"intimately mix two parts of pure Morphia with two parts of Water in a mortar, warmed in a sand-bath, and then add concentrated Acetic Acid to it until the Morphia is dissolved; one part of Acetic Acid, sp. gr. 1.045, will be sufficient. Pour the solution on a shallow porcelain plate, dry at a temperature not to exceed 120° F. powder, and preserve in a closed vessel in a cool place. The yield will be about one-eighth more than the weight of the Morphia employed."

Morphia may be rendered pure and freed from any narcotina which may be present with it, by boiling it in ether, which dissolves only the narcotina. Acetic acid is here used instead of ordinary vinegar, on account of its greater purity. 3775 parts of crystallized Morphia require 638 parts of anhydrous, or 1772 parts of acetic acid, sp. gr. 1.045 (=64 p. ct. of water). The salt crystallizes with difficulty, the solution is therefore evaporated to dryness, which, to avoid decomposition (the volatilization of any of the constitutional acid of the salt), must be done at a moderate temperature. It is best to conduct the evaporation in a shallow porcelain plate.—*Witt.*

Acetate of Morphia is in the form of a snowy white, obscurely crystalline powder, or if crystallized, it is in slender acicular and fasciculated crystals. It is inodorous, but possesses an intense, peculiar, bitter taste. Water dissolves it readily, though not entirely ; this is owing to a loss of some of its acid during evaporation to dryness, so that there is not enough present to hold the Morphia in solution. Consequently, when it is required to use the acetate in solution, a few drops of distilled vinegar added, will render it completely soluble. It is not so readily soluble in alcohol as in water. A strong heat decomposes, and entirely dissipates it. Its aqueous solution, moderately concentrated, is affected by heat, nitric acid, and sesquichloride of iron, in the same manner as morphia; and the alkalies or alkaline earths precipitate morphia from it, but redissolve it if added in excess. Diluted sulphuric acid added to the salt, disengages acetic fumes, and imparts an acetous odor to the solution. It is supposed to consist of one equivalent of base 296.35, one of acid 51.48, and one of water 9=356.83. Its formula is $NC_{35}H_{20}O_6C_4H_3O_3=343$.

Owing to unskillful preparation it may be adulterated with coloring matter, which may be known by the want of its proper whiteness; but it may likewise be adulterated with various white powders. In addition to the above tests of its purity, the following formula of the Edinburgh College will be found generally sufficient to detect the most part of adulterations: "One hundred measures of a solution of ten grains in a half a fluidounce of water and five minims of acetic acid, heated to near 212°, and decomposed by a faint excess of ammonia, yield by agitation a precipitate which in 24 hours occupies 15.5 measures of the liquid."—*C.*

Properties and Uses.—Acetate of Morphia exerts a similar influence upon the system as the other salts of morphia, and is preferred by some practitioners to them; but I have not found the combination of any acid to appreciably affect the therapeutical influence of the morphia. It may be substituted for opium, as a general rule, or for any of the other salts of morphia. The dose to produce an anodyne or hypnotic effect is from one-eighth of a grain to one-quarter; but under certain excitable conditions of the system, even more may be required. One-sixth of a grain represents about a grain of opium. It is sometimes used externally, applied to vesicated surfaces, for the purpose of affecting the system. Internally, it may be given either in the form of pill or solution. A solution (*Liquor Morphiæ Acetatis*) may be formed by adding ten grains of Acetate of Morphia to one fluidounce and a half of Distilled Water, to which add half a fluidounce of Proof-spirit and five minims of Diluted Acetic Acid. The dose of this is from ten to fifteen drops. The alcohol is added to prevent spontaneous decomposition. (*See Ferri et Morphiæ Tartras.*

MORPHIÆ MURIAS. MORPHIÆ HYDROCHLORAS. *Muriate of Morphia. Hydrochlorate of Morphia.*

Preparation.—"Take of pure Morphia *two parts*, rub in a porcelain dish with Water *five parts*, heat to the boiling point, and add pure Hydrochloric Acid until the Morphia is dissolved (one part of Acid, sp. gr. 1.130, will suffice), and then allow it to cool. After standing a day, the crystals which form are separated from the supernatant liquid, which is evaporated to further crystallization. The salt is spread on filtering paper and dried; about two and a half parts by weight should be obtained." —*Witt.*

History.—By the above process, morphia is saturated with muriatic acid, of which saturation its complete solution in the water is an indication. An excess of acid may be known by litmus-paper, which becomes reddened if such be the case. 3775 parts of crystallized morphia require 455 parts of anhydrous, or 1750 parts of hydrochloric acid, sp. gr. 1.130 =74 p. ct. water.—*Witt.*

Muriate of Morphia is usually met with in the form of a pure-white powder; but when crystallized it forms beautifully radiated tufts of delicate feathery or satiny needles. It is inodorous, intensely bitter, permanent in the air, soluble in fourteen parts of water at 60°, and in its own weight at 212°, and is also soluble in alcohol. A concentrated boiling solution forms, on cooling, almost a firm crystalline mass. Muriate of Morphia is decomposed by diluted sulphuric acid, with disengagement of muriatic acid; strong nitric acid forms a deep-yellow solution with it: spirit of nitric ether slowly communicates a yellow color to its solution; the alkalies, especially potassa, and lime-water precipitate morphia from the solution, but redissolve it when added in excess. Heat, and sesquichloride of iron affect it in the same manner as they do morphia. Nitrate of silver added to its solution gives rise to a precipitate of chloride of silver. Its formula is $NC_{35}\,H_{20}\,O_6\,H\,Cl{=}382.42$. The pure salt, dried at 150°, contains 12.7 per cent. of water.—*C.*

Muriate of Morphia prepared by the above process is free from narcotina or other impurity, and the formula is sufficient for its preparation on a small scale; but when to be manufactured on a large scale, the process of Dr. Wm. Gregory will, probably, be found the most economical, by which a large and pure product may be obtained. By his process the meconate of morphia existing in the opium is decomposed by chloride of calcium, which forms, through double affinity, a precipitate of meconate of lime, leaving Muriate of Morphia in solution, which is obtained in crystals by evaporation; these are purified by repeated solution, concentration, and crystallization, and lastly decolorization with animal charcoal. It is important to exhaust the opium with as little water as possible, so as to avoid protracted heat while evaporating. Other methods have been advised, but the one above given is sufficient for all practical purposes of the physician or apothecary.

White sugar is said to enter into Muriate of Morphia as an adulteration. The fermentation test will serve to discover it. The principal impurities, however, that are met with, are coloring matter and moisture, the result of carelessness in its preparation. According to the Edinburg College, Muriate of Morphia should be snow-white, entirely soluble in water, giving a colorless solution; its loss of weight at 212° should not exceed thirteen per cent.; and one hundred measures of a solution of ten grains in half a fluidounce of water, heated nearly to 212°, and decomposed with agitation by a faint excess of ammonia, should yield a precipitate which, in twenty-four hours, occupies 12.5 measures of the liquid.

Properties and Uses.—Muriate of Morphia possesses properties similar to the other salts of morphia, having essentially all the actions of opium. It is much more extensively used in Great Britain than in this country; and may be employed as a substitute for opium, or the acetate, or sulphate of morphia. Its dose is from an eighth of a grain to a half; one-sixth of a grain represents about one grain of opium. A solution of the Muriate of Morphia (*Liquor Morphiæ Hydrochloras*) is made by dissolving one drachm and a half of Hydrochlorate of Morphia in a mixture of Rectified Spirit five fluidounces; Distilled Water fifteen fluidounces; aided by a gentle heat. One hundred and six minims are equivalent to a grain of opium. The dose is from twenty to forty drops. The Alcohol is added to this solution to prevent spontaneous decomposition.

MORPHIÆ SULPHAS. *Sulphate of Morphia.*

Preparation.—Take of pure Morphia *two parts;* rub it in a porcelain dish with *five parts* of Distilled Water, then heat to boiling, and add Sulphuric Acid until the Morphia is dissolved, and then allow the solution to cool. After standing a day the crystals which form are treated in the same manner as named for the crystals of Muriate of Morphia. The Sulphuric Acid must be added gradually, and the mixture be constantly stirred.—*Witt.*

Morphia is here saturated with sulphuric acid, of which saturation its complete solution in the water is an indication. An excess of acid may be known by litmus-paper, which becomes reddened if this be present. The same as in the preparation of the acetate of morphia, the heat must not be too high during evaporation of this salt, else it will be decomposed, and a new body be procured destitute of morphia. 3775 parts of morphia require 613 parts of hydrated sulphuric acid, or 3678 parts of dilute acid containing one-sixth of the mono-hydrated acid.

Sulphate of Morphia is obtained in colorless plumose crystals, frequently in groups, which are odorless, bitter, unalterable in the air, dissolve in water at 60°, and in double their weight of water at 212°. They consist of one equivalent of sulphuric acid=40; one of morphia=292; and six equivalents of water=54. One of these equivalents of water is an essential constituent of the salt, and can not be removed without destroying it; the other five equivalents are the water of crystallization. Its formula is $NC_{35} H_{20} O_6 SO_3 = 332$. Its purity may be determined by employing the tests for the alkaloid and the acid. Pure Sulphate of Morphia is readily and entirely soluble in water, and nearly so in alcohol.

Properties and Uses.—Sulphate of Morphia is probably more often employed in this country than any other of the salts of this alkali, and is considered to be more uniform in its effects on the system. It possesses the usual properties belonging to morphia and its various salts, and is used in cases where these are indicated. The dose is from an eighth of a grain to a quarter, which may be given in pill or solution. One-sixth of a grain is about an equivalent of one grain of opium. A solution of Sulphate of Morphia (*Liquor Morphiæ Sulphatis*), is made by dissolving four grains of the Sulphate of Morphia in *four fluidounces* of Distilled Water. This forms a convenient solution, in which the morphia may be administered in minute or ordinary doses to suit the occasion; it will keep for a long time unaltered. A fluidrachm of this solution is equal to about one-eighth of a grain of the sulphate. When the sulphate is adulterated, or has been carelessly prepared, it does not entirely dissolve in the water, which is usually owing to the presence of morphia which is not combined fully with the sulphuric acid. This difficulty may be overcome by the addition of a few drops of Sulphuric Acid, or eight or ten drops of Elixir Vitriol, and a fluidrachm of Alcohol, which will render the salt wholly soluble in water.

There are other salts of Morphia, as the *Nitrate*, *Phosphate*, and *Tartrate*, prepared as the acetate, by substituting the respective acids ; also the *Hydriodate of Morphia*, made by mixing together strong solutions of muriate of morphia, two parts, and of iodide of potassium rather more than one part. Wash the precipitate with a little cold water ; press it between folds of blotting-paper, redissolve it in hot water, and crystallize. Doses of these same as the acetate. *Iodide of Morphia* is obtained by dissolving 120 equivalents of dry acetate of morphia in eight times the weight o cold distilled water, adding, if necessary, a few drops of pure acetic acid, and mixing the filtered solution with a solution of sixty equivalents o iodide of potassium. After some time the salt crystallizes in very slender crystals, but which may be obtained of larger size by heating the mixture on a water-bath, and allowing it to cool slowly. It closely resembles in form, color, etc., the sulphate of quinia. It is insoluble in cold water, soluble in hot water, and readily in alcohol; the solutions have a bitter taste. Morphia neutralized with valerianic acid, forms *Valerianate of Morphia*, a salt which is used to some extent in nervous diseases, restlessness in fevers, etc. The dose is the same as the sulphate of morphia.

OLEA DESTILLATA.

Distilled Oils.

For an account of Volatile, Distilled, or Essential Oils, see Olea Volatilia, Part I., page 869.

The Edinburgh Pharmacopœia gives the following general directions :

"Volatile Oils are obtained chiefly from the flowers, leaves, fruits, barks and roots of plants, by distilling them with water, in which they have been allowed to macerate for some time. Flowers, leaves, and fruits generally yield the finest oils, and in greatest quantity when they are used fresh. Many, however, answer equally well if they have been preserved by beating them into a pulp with about twice their weight of muriate of soda, and keeping the mixture in well closed vessels.

Substances yielding Volatile Oils must be distilled with water, the proper proportion of which varies for each article, and for the several qualities of each. In all instances, the quantity must be such as to prevent any of the material from being empyreumatized before the whole oil is carried over. In operations where the material is of pulpy consistence, other contrivances must be resorted to for the same purpose. These consist chiefly of particular modes of applying heat, so as to maintain a regulated temperature not much above 212°. On the small scale, heat may be thus conveniently applied by means of a bath of a strong solution of muriate of lime, or by means of an oil-bath, kept at a stationary temperature with the aid of a thermometer.

On the large scale heat is often applied by means of steam under regulated pressure. In other operations it is found sufficient to hang the material within the still in a cage or bag of fine network, and sometimes the material is not mingled with the water at all, but is subjected to a current of steam passing through it. The best mode of collecting the oil is by means of a refrigeratory, from which the water and oil drop together into a tall narrow vessel provided with a lateral tube or lip near the top, and another tube rising from the bottom to about a quarter of an inch below the level of the former. It is evident that with a receiver of this construction the water will escape by the lower tube ; while the Volatile Oil, as it accumulates, will be discharged by the upper one, except in the very few instances where the oil is heavier than water. By attending to the general principles now explained, Volatile Oils may be readily obtained, of excellent quality, from the flowers of *Anthemis Nobilis*, *Lavandula Vera*, and *Ruta Graveolens ;* from the fruit of *Anethum Graveolens*, ruised; *Carum Carui*, bruised; *Eugenia Pimenta*, bruised; *Fœniculum Officinale*, bruised; *Piper Cubeba,* ground; and *Pimpinella Anisum*, ground; from the undeveloped dried flowers of *Caryophyllus Aromaticus ;* rom the tops of *Juniperus Sabina*, and *Rosmarinus Officinalis ;* from the entire herb of *Mentha Piperita*, *M. Pulegium*, *M. Viridis*, and *Origanum Majorana;* and also from the bruised root of *Sassafras Officinale.*

The Dublin Pharmacopœia gives the following officinal directions:

" The VOLATILE OR ESSENTIAL OILS may be obtained by the following general process: The substance from which the oil is to be extracted is macerated for twenty-four hours, with five times its weight of water, in a sheet-tin or copper still, and, a condenser being then attached, half the water is drawn over by distillation, on the surface of which the oil will be found to float, unless (which is rarely the case), it should be heavier than water, when it will be found at the bottom of the receiver. The oil having been separated, the aqueous product, which is a saturated solution of the oil in water, is to be returned to the still, and the distillation resumed, and continued till the resulting liquid has the same volume as before. The oil is again separated, the watery product returned to the still, and the distillation resumed; and this process is to be repeated until it ceases to afford any additional oily product. The oil thus obtained is to be separated as completely as possible from water, and preserved in a well-stopped bottle.

In this way Volatile Oils may be obtained from the entire herb of *Mentha Piperita*, *Mentha Pulegium*, *Mentha Viridis;* from the seeds or fruit of *Carum Carui*, *Cubeba Officinalis*, *Eugenia Pimenta*, *Fœniculum Officinale*, *Juniperus Communis*, *Myristica Moschata*, *Pimpinella Anisum;* from the flowers of *Anthemis Nobilis*, *Lavandula Vera;* from the undeveloped dried flowers of *Caryophyllus Aromaticus;* from the tops of *Juniperus Sabina*, *Rosmarinus Officinalis;* from the bark of *Cinnamomum Zeylanicum.* The water distilled over in the preparation of the several oils should be preserved for medical use."

Volatile Oils are contained in cells, generally peculiar, and often so large as to be distinct to the naked eye. They frequently exist in such an abundance, that they may be obtained by mere expression, as with the oils of lemon, orange, bergamot, and citron. Sometimes they exude spontaneously or from incisions, in combination with gum or resin, as in the case of turpentine. And again, the Volatile Oil is not formed in the plants until the reaction of water is obtained upon certain constituent principles, as in the case of the oils of black mustard-seed, and bitter almonds, and perhaps peach-leaves, peach-kernels, etc. Most commonly it adheres with more or less force to the parts of the plant containing it, either becoming destroyed or dispersed when the plant is dried or retained in part or altogether, even when long kept.

The greatest amount of Volatile Oil is procured by distilling an aromatic plant in its recent state; indeed, several articles must be distilled, while recent, as by drying they lose their oil. Occasionally, however, a dried substance is used for obtaining Volatile Oil, and when this is the case, the article must be brought to a state of coarse comminution, and then be permitted to soak in water until it is softened, or, until the water has completely penetrated it. Steam heat is the best for the preparation of oils, because it is less apt to injure them; but some oils will not pass over at a heat of 212° F., in consequence of which a strong solution of common salt is substituted for the water, and which solution requires a temperature of at least 230° F. to boil it. But oils are apt to become empyreumatized by a high temperature. It must be recollected that Volatile Oils are injured by too great a degree of heat, and that in consequence thereof, the degree of heat employed in their distillation should be as low as may be consistent for the ascent of the oil.

The amount of water added to the plants in distillation, should be sufficient to cover them; if it be in too large a quantity, a material loss may be sustained by solution of the oil in the water; if too small, all the oil will not be separated, and the plant may be scorched, more especially if the vessel containing it be exposed to a direct fire, instead of a steam or water-bath. Not only will a proper amount of water cause a ready separation of oils, even among those which by themselves would not ascend at 212°, but it likewise interferes with any proneness to decomposition by maintaining a regular degree of heat. Plants which are fresh do not generally need so much water as dried ones. If too much water be used it may boil over; to prevent which, the vessel used for distilling should not be more than two-thirds full altogether. In some instances, where the oil exists in minute quantity, and is of great value, the distilled fluid should be left at rest for some time, and exposed to as low a temperature as can be commanded. Sometimes, the quantity of oil is so minute that the water retains it in solution; this is obviated by placing the same water on renewed quantities of the herb, and subjecting it to redistillation, repeating the process a number of times, or until the water can take up no more of the oil. The oil is separated from the water after distillation by instruments adapted for the purpose, called *Separatories*, of which there are several in use. (*See Procter's Mohr and Redwood's Pharmacy*, pp. 351–356.)

The unpleasant empyreumatic smell which some Volatile Oils exhale immediately after having been obtained, may, in most instances, be removed by placing a layer of paper, a plate of glass, or a piece of oil-silk over the mouth of the vessel containing them, and allowing it to stand thus for a few days, or until this peculiar odor has disappeared. Volatile Oils should always be kept in well closed, dark bottles; otherwise they absorb oxygen from the atmosphere, become turbid, deposit resin, and lose the purity and richness of their aroma. These may, in a great measure, be improved by agitating them with animal charcoal recently heated; this will also answer the purpose of freeing them from water, which injures some oils.—*C.*

"The following Table, showing the proportion of Volatile Oil obtained from the chief Medicinal Vegetable Substances, according to the most recent experiments, will be found useful in several ways. Among other things it illustrates several of the general statements now made as to the influence of modes of preparation and circumstances in vegetation upon the quantity of oil. The data are chiefly extracted or calculated from experiments by M. Raybaud in the *Journal de Pharmacie, XX.;* by Dr. Martius in *Repertorium für die Pharmacie, XXXIX.;* by Dr. Bley in the same work, XLVIII.; by M. Dann and by M. Voelter in the same work, LV.; and a few have been added from experiments of my own. The numbers represent the number of ounces obtained from 100 pounds avoirdupois. The experiments of the continental authorities were commonly made on the large scale. My own were made on a small scale; and from a comparative trial in one or two instances upon a large scale, I am disposed to give the preference for accuracy to small operations, when they are carefully conducted. The letters before the figures refer to the authority for each :—

Amygdalus communis. Bitter almond	Ra.	0.38
Amygdalus communis. Bitter almond	Vo.	7.70
Amygdalus communis. Bitter almond (Duflos)	0.8 to.	4.80
Angelica Archangelica—dried root	Ra.	4.50
Anthemis nobilis—fresh flowers raised at *Grasse*	Ra.	0.75
Anthemis nobilis—dried flowers, do do	Ra.	1.38
Anthemis nobilis—dried flowers, long kept, *Germany*	Bl.	4.50
Anthemis nobilis—flowers fresh dried	Steer.	5.33
Anthemis nobilis—flowers 12 months dried	Steer.	3.0
Apium graveolens—dried fruit	Ra.	9.00
Apium Petroselinum—fresh herb, after flowering	Ra.	3.38
Apium Petroselinum—dry fruit, *France*	Ra.	12.0
Apium Petroselinum—dry fruit, *Germany*	Da.	30.0
Artemisia Absinthium—fresh herb, *Paris*	Ra.	12.0
Artemisia Absinthium—dried herb, recent, *Germany*	Ma.	6.0
Artemisia Absinthium—dried herb, a year old, *Germany*	Bl.	8.75
Artemisia Absinthium—dried herb, 3 years old, *Germany*	Ma.	5.0
Artemisia ——? Wormseed of commerce	Ra.	3.0
Artemisia ——? Levant wormseed	Vo.	10.8
Calamus aromaticus—fresh root, *Germany*	Ma.	16.0
Calamus aromaticus—recently dried, *Germany*	Bl.	17.5
Calamus aromaticus—long dried, *Germany*	Da.	14.3
Carum Carui—dried fruit of French commerce	Ra.	50.12
Carum Carui—dried fruit of German commerce	Ma.	66.5
Carum Carui—dried fruit of German commerce	Da.	46.6
Carum Carui—dried fruit of German commerce	Vo.	70.0
Caryophyllus aromaticus. Cloves, *Bourbon*	Ra.	144.0
Caryophyllus aromaticus. Cloves, *Cayenne*	Ra.	152.0
Caryophyllus aromaticus. Cloves, *Cayenne*	Bl.	125.0
Caryophyllus aromaticus. Cloves, *Molucca:* French commerce	Ra.	148.0
Caryophyllus aromaticus. Cloves, *Molucca:* English commerce	Ra.	112.5
Caryophyllus aromaticus. Cloves, average German commerce	Vo.	226.0
Caryophyllus aromaticus. Cloves, finest German commerce	Da.	250.0
Caryophyllus aromaticus. Cloves, German commerce	Steer.	272.0
Cinnamomum zeylanicum, cinnamon of commerce	Ra.	1.56
Cinnamomum Cassia—cassia bark of commerce	Ra.	12.0
Citrus Aurantium—Sweet orange flowers, 1 May, *Nice*	Ra.	5.0
Citrus vulgaris—Bitter orange flowers, 7 May, *Nice*	Ra.	5.9
Citrus vulgaris, do do do 12 May, *Carmet*	Ra.	4.12
Citrus vulgaris, do do do 16 July, *Paris*	Ra.	0.9
Citrus vulgaris, do do do 14 Dec., *Paris*	Ra.	6.5
Citrus Aurantium—rind of 100 oranges, by expression	Ra.	2.5
Citrus Aurantium, do by distillation	Ra.	2.75

Citrus vulgaris—rind of 100 oranges, by expression	Ra.	4.0
Citrus vulgaris, do by distillation	Ra.	4.25
Citrus Limetta, rind of 100 limes, by distillation	Ra.	2.12
Citrus Bergamium, rind of 100 bergamots, by distillation	Ra.	2.9
Citrus Limonum, rind of 100 lemons by expression	Ra.	1.9
Citrus Limonum, do by distillation	Ra.	1.4
Cochlearia Armoracia—fresh seeds	Ra.	0.9
Coriandrum sativum—dry fruit of French commerce	Ra.	2.3
Coriandrum sativum—dry fruit of German commerce	Da	9.0
Croton Eleutheria—cascarilla bark	Bl.	5.62
Cuminum Cyminum—dry fruit of French commerce	Ra.	44.0
Cuminum Cyminum—dry fruit of German commerce	Bl.	32.5
Daucus Carota—dry fruit	Ra.	0.66
Daucus Carota—fresh root	Ra.	0.14
Dracocephalum moldavicum, flowering herb	Ra.	2.10
Drimys Winteri—Winter's bark (probably, however, only Canella alba)	Ra.	0.50
Eugenia Pimenta—pimenta berries, *Jamaica*	Ra.	12.38
Fœniculum* officinale—dry fruit of French commerce	Ra.	33.0
Fœniculum* officinale—dry fruit of German commerce	Ma.	56.6
Fœniculum* officinale, do German commerce	Bl.	83.0
Fœniculum* officinale, do German commerce	Da.	60.4
Fœniculum officinale—flowering herb, *Grasse*	Ra.	4.9
Fœniculum officinale—herb after flowering, *Grasse*	Ra.	6.0
Galipea officinalis—Cusparia-bark of commerce	Ra.	1.5
Genista canariensis, Rhodium-wood	Ra.	0.47
Geum urbanum—dry roots	Ra.	0.53
Hyssopus officinalis—flowering herb, *Grasse*	Ra.	5.30
Illicium anisatum—star-anise-fruit	Ra.	34.21
Illicium anisatum—star-anise-fruit	Da.	25.5
Juniperus communis—green berries, 12 Sept	Ra.	3.9
Juniperus communis—ripe berries, 1 Dec., *France*	Ra.	7.75
Juniperus communis, do fresh, *Germany*	Da.	15.5
Juniperus communis, do a year old, *Germany*	Ma.	10.8
Juniperus communis, do a year old, *Germany*	Bl.	16.25
Juniperus Sabina—fresh twigs, 5 March, *Grasse*	Ra.	19.05
Juniperus Sabina—fresh twigs, 2 Oct., *Paris*	Ra.	14.25
Juniperus Sabina—dried twigs, recent, *Germany*	Ma.	40.0
Juniperus Sabina—dried twigs, a year old, *Germany*	Ma.	25.0
Larix Cedrus—fresh cedar wood, *Paris*	Ra.	0.3
Larix Cedrus—cedar wood of commerce	Ra.	4.25
Laurus nobilis—fresh leaves, 26 Jan., *Paris*	Ra.	5.25
Laurus nobilis—leaves some years dried, *Germany*	Bl.	4.10
Laurus nobilis— fresh leaves, poor soil, low site	Chr.	7.33
Laurus nobilis— early in Oct. poor soil, high site	Chr.	6.9
Laurus nobilis— near *Edinb.* very fine soil, low site	Chr.	17.12
Lavandula vera—flowering herbs, 2 Aug., *Grasse*	Ra.	11.5
Lavandula vera, do do 2 Aug., *Grasse*, north exposure	Ra.	9.12
Lavandula vera—flowering herb, 26 July, *Soureillas*	Ra.	9.0
Lavandula vera—herb after flowering, 26 Sept., *Soureillas*	Ra.	15.0
Lavandula Spica—fresh herb, 24 July, *Paris*	Ra.	7.62
Lavandula Spica—fresh herb, 4 Aug., *Grasse*	Ra.	12.5
Lavandula Stoechas—dried spikes	Ra.	6.43
Ligusticum Levisticum—fresh herb, *Paris*	Ra.	1.12
Melissa officinalis—fresh flowering herb	Ra.	0.25
Mentha piperita...fresh tops in flower, *Grasse*	Ra.	6.25
Mentha piperita—fresh tops in flower, *Paris*	Ra.	3.40
Mentha piperita—dried tops in flower, *Germany*	Bl.	15.62
Mentha piperita—dried tops in flower, *Germany*	Ma.	21.0
Mentha Pulegium, fresh flowering herb	Ra.	1.0
Myristica moschata—mace of commerce, finest	Vo.	154.0
Myristica moschata, do do fine	Bl.	125.0
Myristica moschata, do do worm-eaten	Bl.	65.6

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*It does not appear what is the exact species or variety of fennel understood by the authors of these four experiments, as they use the vague name of *Anethum Fœniculum.*

Myristica moschata—nutmegs of commerce, fine	Bl.	108.25
Myristica moschata, do do worm-eaten	Bl.	64.1
Myrtus communis—fresh leaves, Sept. 20, *Grasse*	Ra.	4.5
Myrtus communis—fresh leaves, Sept 6, *Paris*	Ra.	2.5
Origanum Majorana—fresh flowering herb, Aug. 3, *Grasse*	Ra.	8.5
Origanum Majorana—fresh flowering herb, Aug. 3, *Paris*	Ra.	4.4
Origanum vulgare—fresh flowering herb, Sept. 15, *Paris*	Ra.	0.4
Pimpinella Anisum—dry fruit of French commerce	Ra.	35.12
Pimpinella Anisum—dry fruit, new, German commerce	Ma.	37.5
Pimpinella Anisum—dry fruit, old, German commerce	Ma.	27.0
Pimpinella Anisum—dry fruit of German commerce	Vo.	25.0
Pimpinella Anisum, do do do	Da.	43.75
Piper Cubeba—Cubebs of French commerce	Ra.	19.5
Piper nigrum—White pepper of do	Ra.	16.0
Piper nigrum—Black pepper of do	Ra.	18.12
Prunus Lauro-cerasus—fresh leaves, November 23, *Paris*	Ra.	2.12
Prunus Lauro-cerasus, fresh leaves from the same plants: near *Edinburgh*, undeveloped, June 7	Chr.	10.13
Prunus Lauro-cerasus, half-grown, June 7	Chr.	7.20
Prunus Lauro-cerasus, full-gr., 8 weeks on tree, July 15	Chr.	4.96
Prunus Lauro-cerasus, 12 months on tree, June 2	Chr.	1.04
Prunus Lauro-cerasus, Fresh leaves of the same plant, 1 Sept., 1836, *Edin.* 3 months on tree	Chr.	7.04
Prunus Lauro-cerasus, 15 months on tree	Chr.	2.24
Renealmia Cardamomum—lesser cardamoms	Ra.	11.42
Rosa centifolia, fresh flowers, *Grasse*	Ra.	0.25
Rosmarinus officinalis—fresh flowering herb, *Grasse*	Ra.	5.0
Rosmarinus officinalis, do *Paris*	Ra.	3.5
Ruta graveolens—fresh flowering herb, 20 July, *Grasse*	Ra.	4.12
Ruta graveolens, do 28 July, *Paris*	Ra.	0.63
Ruta graveolens—flowering herb, newly drid, *Germany*	Bl.	4.4
Ruta graveolens—dried seeds, *South of France*	Ra.	19.0
Salvia officinalis, v. *minor*—fresh herb, 12 March, *Grasse*	Ra.	6.0
Salvia officinalis, v. *minor*—fresh herb, 14 June, *Paris*	Ra.	2.5
Salvia officinalis, v. *major*—fresh herb, 12 March, *Grasse*	Ra.	4.0
Salvia officinalis, v. *major*—fresh herb, 14 June, *Paris*	Ra.	3.05
Santalum album—sandal wood of commerce	Ra.	5.0
Sinapis nigra—black mustard-seed, *Germany*, 12 months old	Da.	3.9
Sinapis nigra—black mustard-seed, *Germany*, fresh	Da.	5.0
Sinapis nigra—black mustard-seed, *France*, fresh	Da.	7.75
Sinapis nigra—black mustard-seed, *France*	Vo.	9.1
Tanacetum vulgare—fresh flowering herb, 9 July, *Grasse*	Ra.	1.2
Tanacetum vulgare—fresh flowering herb, 25 July, *Paris*	Ra.	5.8
Tanacetum vulgare—fresh tops, *Germany*	Da.	5.0
Tanacetum vulgare—dried flowering herb, *Germany*	Bl.	15.6
Thuya occidentalis, fresh twigs near *Edinb.* Aged, stunted tree; exposed. Oct. 21	Chr.	10.8
Thuya occidentalis, Aged, vigorous; sheltered. Oct. 21	Chr.	10.25
Thuya occidentalis, Young, vigorous; exposed. Oct. 9	Chr.	18.25
Thuya occidentalis, Young, vig.; exposed; fine soil. Sept. 26	Chr.	26.40
Thymus Serpyllum—fresh flowering herb, 6 Aug., *Grasse*	Ra.	5.0
Thymus Serpyllum—fresh flowering herb, 5 July, *Paris*	Ra.	0.9
Thymus vulgaris—fresh flowering herb, 16 Aug., *Grasse*	Ra.	6.5
Thymus vulgaris—fresh flowering herb, 13 July, *Paris*	Ra.	3.75
Valeriana officinalis—dry root, a year old, *Germany*	Bl.	30.16
Valeriana officinalis—the root, *Germany*	Da.	15.0
Valeriana officinalis—the root, *Germany*	Vo.	10.5
Verbena odorata—fresh flowering herb, *Paris*	Ra.	3.1
Zingiber officinale—dry root of commerce	Ra.	10.8

The facts in the preceding table seem to show that the flowers of *Anthemis Nobilis*, the berries of *Juniperus Communis*, and the root of *Acorus Calamus* may be both dried and long kept, without material loss of volatile oil; but that the herb of *Artemisia Absinthium* and the tops of *Juniperus Sabina*, though they may be dried, can not be long preserved, without loss. It further appears that the seed of *Sinapis Nigra* can not be long kept without material loss; and that the mace and kernel of *Myristica Moschata* suffer greatly in their proportion of oil, when attacked by worms. The influence of season is well exemplified in the case of the flowers of *Citrus Aurantium*, which is well known to flower at different periods of the year. The effect of climate is equally well shown in many examples, such as the wood of *Larix Cedrus*, the herb or flowering tops of *Lavandula Vera*, *Lavandula Spica*, *Mentha Piperita*, *Myrtus Vulgaris*, *Origanum Majorana*, *Rosmarinus Officinalis*, *Thymus Serpyllum*, *Thymus Vulgaris*, *Tanacetum Vulgare*, and the seeds of *Sinapis Nigra*. Under this head, the great superiority of Grasse, in the south of France, over Paris for raising plants for distilling oils, is remarkable. The effect of soil or site is exhibited in my own experiments with the leaves of *Laurus Nobilis* and *Thuya Occidentalis;* and that of the progress of vegetation is excellently shown in the instances of the herb of *Fœniculum Officinale* and *Lavandula Vera*, the berries of *Juniperus Communis*, but above all, the leaves of *Prunus Laurocerasus*. Further, the table presents many examples, but especially under *Caryophyllus Aromaticus*, *Carum Carui*, *Coriandrum Sativum*, and *Illicium Anisatum*, of great differences prevailing in the relative proportion of volatile oil, and consequently in relative activity, between different specimens of the same vegetable substances as it occurs in ordinary commerce. In conclusion, it should be observed, that the circumstances most favorable to the proportion of volatile oil are not necessarily always most favorable to its quality. Raybaud mentions that the cloves of English commerce, which will be seen (*Caryophyllus Aromaticus*) from the table to have furnished the lowest proportion of oil, produce it of finer quality than other kinds he examined. And lavender, which yields considerably more volatile oil after flowering than during inflorescence (*Lavandula Vera*), produces in the latter case an oil of more delicate fragrance than in the former; and it is not so acrid."

The above useful information is extracted from Christison's Dispensatory, and will, undoubtedly, prove serviceable to the apothecary and manufacturing chemist.

Volatile oils possess almost universally the peculiar medicinal virtues of their respective plants. They are most commonly used in the form of alcoholic tincture, under the name of *Essences;* or, a drop or two of the oil may be received on a little sugar, and dissolved by that intermedium in water, mucilage, etc.

OLEUM ANISI. *Oil of Anise.*

History.—This oil is prepared by distilling Anise with water, as heretofore explained, on page 1175. According to Mr. Brande, one cwt. of the seeds or fruit yields about two pounds of oil. When carefully prepared it is transparent and nearly colorless, having a slightly yellow tinge, with the taste and odor of the fruit from which it was obtained. When fresh distilled its sp. gr. is 0.979, but this increases by time, so that after eighteen months it may have the sp. gr. 0.9853. It congeals at 50° and liquefies again at 63° F. It readily dissolves in alcohol. By exposure to the air it forms resin, and is less apt to solidify. It is composed of two volatile oils,—one, *stearoptène*, solid at 60°, the other, *eleoptène*, liquid,—in the following proportions, eleoptène 75, stearoptène 25.—*P.* Stearoptène becomes liquid when long kept; according to Cahours, it consists of $C_{20}H_{12}O_2$. When Oil of Anise is adulterated with wax or spermaceti, these may be known by being insoluble in cold alcohol; camphor may be recognized by its odor.—*See Am. Jour. Pharm.*, *XXVII.*, 472. Oil of Anise is commonly procured from Europe. The purity of Oil of Anise may be known by its specific gravity from 0.97 to 0.99, as well as its disposition to congeal readily at below a medium temperature. But still better by its quick congelation into a solid hard mass with iodine, accompanied with a perceptible increase of heat, and the development of yellowish-red and gray vapors. Sulphuric acid heated with the oil produces a beautiful purple-red color, and quickly inspissates and hardens it. Its other reactions are similar to those of the Oil of Star-anise.

The purity of Oil of Star-anise may be known by its combination with iodine, which takes place with a less development of vapor and heat, and its congelation into a solid resinous substance. By sulphuric acid this oil becomes easily inspissated, is changed into a solid mass, and becomes by heat dark blood-red. Nitric acid, however, produces only a thick fluid balsam, while the oil becomes yellow, and by heat reddish-brown. The difficulty with which the oil is dissolved in five or six parts of alcohol, and in the alcoholic solution of caustic potassa, with slight coloration, as also its relation to cold, are useful tests.—*Zeller.*

Properties and Uses.—Carminative and antispasmodic, and especially adapted to flatulency and colic of infants. It likewise, in connection with aqua ammonia, affords relief in spasmodic cough. The dose is from five to ten drops. The oil of star aniseed (*Oleum Badiana*) has the flavor of anise, and is frequently substituted for it.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum; Mistura Cajuputi Composita; Tinctura Anisi; Tinctura Opii Camphorata.

OLEUM ANTHEMIDIS. *Oil of Chamomile.*

History.—Oil of Chamomile is obtained by distillation of Chamomile Flowers with Water, a thousand parts of which yield about eight parts of oil; when first obtained it is greenish or bluish, but finally becomes yellowish-brown; its specific gravity is about 0.9083. It has the odor of chamomile flowers, and an aromatic, somewhat pungent taste. It is said to be a mixture of carbo-hydrogen with an oxygenated oil. It is prepared in Europe.

Properties and Uses.—Oil of Chamomile is tonic and antispasmodic; and has been found very serviceable in spasm of the stomach, painful dysmenorrhea, hiccough, pertussis, and to prevent or lessen the griping influence of some cathartics. The dose is from five to ten drops. The *Matri-*

caria Chamomilla furnishes a thick, deep-blue oil, becoming brown by age, and which is frequently substituted for the Oil of Chamomile. It is less antispasmodic than the true chamomile oil.

OLEUM BERGAMII. *Oil of Bergamot.*

History.—Oil of Bergamot exists in the rind of the fruit of *Citrus Bergamia* or *C. Limetta*, from which it may be obtained by expression in the same manner as for procuring the oil of lemon. It may also be obtained by distillation, but the product is not so agreeable as by expression. According to Wight and Arnott, the *leaves* of the bergamot tree are oblong, more or less elongated, acute, or obtuse, under side somewhat pale; *petiole* more or less winged or margined; *flowers* usually small and white; *fruit* pale-yellow, pyriform or depressed; *rind* with concave receptacles of oil; *pulp* more or less acid. About two ounces and a half of oil may be obtained by expression from one hundred bergamots. The plant is cultivated in the south of Europe, from whence the oil is imported. It has a peculiar, agreeable, rich fragrance, and an aromatic bitter taste; its color is pale-yellow, with a greenish tint. Its sp. gr. is 0.885; it concretes at 30°; and, unlike the oils of lemon and orange, it is dissolved by liquor potassa. Its composition is the same as oil of lemons—$C_{10} H_8$.

The oils of the auriantaceæ are, in a still higher degree than the lavender oil, protected by their delicate odor from adulteration, except with alcohol; on the other hand, a mixture of these oils with one another is easier effected, and detected with greater difficulty. There might, however, be but little inducement for doing this, except in the case of oil of orange flowers, which is proportionately much dearer than the others. The similarity of the respective chemical properties admits also here of no better test than the smell. The unvarying and great specific gravity, from 0.87 to 0.88, will serve to detect any admixture of alcohol. The relation which the bergamot oil has to this solvent shows distinctly the difference which exists between its own proportion of oxygen and that of the other oils of the same family; it is readily dissolved in alcohol, but, like the other oils, it makes, at least when fresh, the solution opaque. It is also distinguished from the orange and lemon oils by being easily and clearly dissolved in liquor potassa. This difference in its elements is also manifested in the reaction upon iodine, not so much with regard to its fulminating property, which, although weaker than the lemon oil, is rather stronger than in the orange oil, but by the homogeneous nature of the residue, which, in the two last mentioned oils, and in all oils free of oxygen, consists of two combinations, differing in consistency. By the incapacity of dissolving santaline, this oil is, as well as the others of the same family, protected against an admixture of alcohol. One part of alcohol added to five parts of the oil is hardly able to impair the fulmination; two drops of alcohol added to three drops of oil produce certainly no real fulmination, but still a lively reciprocal action with effervescence.—*Zeller.*

Properties and Uses.—Gently excitant, but is used almost wholly in perfumery.

OLEUM CAJUPUTI. *Cajeput Oil.*

History.—This oil is obtained from the leaves of Melaleuca Cajuputi, a tree growing in the Moluccas and adjacent islands, and belonging to the *Nat. Ord.*—Myrtaceæ; *Sex. Syst.*—Polyadelphia Icosandria. It is a small tree, with a tolerably erect but crooked *trunk;* a soft, thick, spongy, whitish, ash-colored *bark;* and scattered *branches*, with the slender twigs often drooping as completely as in the weeping-willow (*Salix Babylonica*). The *leaves* are alternate, most frequently vertical, short-stalked, narrow-lanceolate, while young, sericeous, sometimes slightly falcate, entire, from three to five inches long, and from a half to three-fourths of an inch broad; very aromatic when bruised. *Flowers* ternate, sessile, small, white, scentless, in terminal and axillary, downy spikes; *bracts* solitary, lanceolate, silky, caducous. *Calyx* urceolate. *Corolla* white, orbicular; *filaments* thirty to forty, much longer than the petals; *anthers* ovate-cordate, with a yellow gland on the apex. *Style* somewhat longer than the stamens; *stigma* obscurely three-lobed. *Capsules* three-celled, three-valved; *seeds* numerous, angularly wedge-shaped.—*L.*

Cajeput Oil is obtained by distillation of the leaves, which are collected in autumn, allowed to steep for a night in water, and then distilled in copper vessels. The yield is very sparse. It is imported from the East Indies in green glass bottles. The oil is transparent, limpid, of a grass-green color, a strong, penetrating odor, resembling the combined odor of camphor, rosemary, and cardamom, and an aromatic camphoraceous taste, succeeded by an impression of coolness. The green color is not essential, and may be removed by distillation; nor is it owing to the presence of copper, as was once thought. True, it sometimes contains oxide of copper in solution, as has been ascertained by Guibourt; but the pure green oil has given no indications of the presence of this metal, the green color being attributed by M. Lesson to chlorophyll, or perhaps a somewhat different resinous principle. When copper is present, a red precipitate is formed by shaking the oil with a solution of ferrocyanuret of potassium. Oil of Cajeput varies in sp. gr. from 0.914 to 0.9274; it is entirely soluble in alcohol, boils at 343° F., and when distilled, yields first a colorless oil of sp. gr. 0.897, and then a green oil, weaker in odor, but more acrid in taste, and having the sp. gr. 0.920. Sulphuric and nitric acids have but little action on Cajeput Oil; it dissolves iodine, and converts potassium into potassa. It is composed of $C_{10}\ H_9\ O{=}77$.

In consequence of its price it is very subject to adulteration. Oils of rosemary or turpentine, combined with camphor and bruised cardamom seeds, and appropriately tinted with milfoil resin, are often sold as genuine oil. Fulminating oils are easily detected, also the more energetically acting oils of the labiatæ, viz.: oils of lavender, origanum, and spireæ; also the less violently acting oils of labiatæ, as—oil of rosemary, which serves most frequently for adulteration, but which are distinguished by the energetic action of a solution of iodine, and can be recognized by the degree of energy with which this reaction takes place ; all, however, would materially alter the nature of the residue of the iodine test presently to be described. Under certain circumstances, the oil of rosemary manifests, also, some coagulating parts in its residue, but which always has the consistency of a soft extract.

The slight changes of color in Oil of Cajeput, which are produced by chromate of potassa, are somewhat more marked with the oil of rosemary, but the equally slight color of the solution in liquor potassa, which is clear in the cold, and turbid when warm, is the same in oil of rosemary. The latter oil could not be detected by the sulphuric acid test; the latter assumes a deep-red yellowish color, and the oil becomes brownish; by this, however, many other adulterations may be indicated. The weak coloration of the Oil of Cajeput by nitric acid, which imparts only a reddish and brownish color, accompanied by a violent reaction and formation of a liquid balsam, will easily distinguish it from some other oils, but not from oil of rosemary.

Iodine is the safest test of the purity of the rectified Oil of Cajeput; it can be recognized by a sensation of cold which it leaves behind in the mouth. Its sp. gr. being below 0.91 to 0.92 will show the presence of lighter oils and alcohol, and a divided rectification; and its relation to water will detect the adulteration with camphor. When, as above referred to, iodine is added to Oil of Cajeput, a slightly energetic reciprocal action ensues, during which the temperature is but little increased, with the slight development of yellowish-red vapors; the *residue* immediately becomes inspissated into a loose coagulum, which is soon changed into a dry, greenish-brown, brittle mass.—*Zeller.* The genuine oil, it must be recollected, burns entirely away, leaving no residue; and beside the test above given, copper may be detected by dissolving the residuum which is left after burning the oil in nitric acid, which becomes violet-colored when ammonia is added in excess.

Properties and Uses.—Cajeput Oil is a powerful diffusive stimulant, diaphoretic, and antispasmodic. When swallowed it occasions a warmth in the stomach, with an increased action of the pulse, and occasionally diaphoresis. It is very much valued in the islands of the Indian ocean, the inhabitants of which employ it extensively in rheumatism, palsy, epilepsy, and many other diseases; using it both internally and as a local application. It may be advantageously employed internally in chronic rheumatism, hysteria, colic, spasms or cramps of the stomach or bowels, cholera-morbus, Asiatic cholera, in the typhoid stage of fevers, and wherever a powerful stimulant is required. It should never be given internally when inflammation is present. Externally, it is very beneficial as an application to rheumatic, neuralgic and other pains, and may be used alone, or in combination with other oils. Applied to the cavity of a carious tooth, it alleviates toothache. The dose is from one to ten drops, on sugar, in emulsion, or in sweetened brandy and water.

Off. Prep.—Mistura Cajuputi Composita; Mistura Olei Camphorata; Tinctura Camphoræ Composita.

OLEUM CARI. OLEUM CARUI. *Oil of Caraway.*

History.—This oil is easily separated by distillation of the fresh fruit with water, which yields from 4.7 to 5.43 per cent. When fresh prepared it is colorless, but by keeping becomes yellow, and ultimately brown. It is limpid, and has the odor of the fruit, and an acrid taste. Its specific gravity is 0.950, though this varies. According to Schweizer it is composed of carbon 86.14, hydrogen 10.68, and oxygen 3.18. When submitted to distillation with caustic potassa, it yields a carbo-hydrogen *Carvene*, $C_{10}H_8$. The brown residue in the retort yields, when mixed with water, a brown resin, and a brown alkaline solution. If the latter be saturated with an acid, and distilled, an acrid oil *Carvacrol* is obtained, $C_{40}H_{28}O_3$.—*P.*

Properties and Uses.—Oil of Caraway is a warm diffusible stimulant and carminative. It is frequently used to allay the griping and sickening effects of medicines, also to increase their flavor. It is considerably used in cake and confectionary. The dose is from one to five or ten drops. *Carvacrol* placed on cotton, and introduced into the cavity of a carious tooth, is said to give prompt relief.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum.

OLEUM CARYOPHYLLI. *Oil of Cloves.*

History.—Oil of Cloves is procured by submitting Cloves, with water, to repeated distillation; to extract the whole of the oil from cloves, they must be subjected to repeated cohobations. On an average they yield from 17 to 22 per cent. of volatile oil. When first obtained Oil of Cloves is a colorless or light-yellow fluid, but the color deepens by keeping, and ultimately becomes dark brown. It has the well known smell of Cloves and a hot, disagreeable, biting taste. Its specific gravity is variable, being given at from 1.034 to 1.061. It sinks in water, in which it is sparingly soluble; it is freely dissolved by alcohol, ether, concentrated acetic acid, and the fixed oils. Nitric acid reddens it, and when the mixture is heated, oxalic acid is formed. It is one of the least volatile, and most difficult to distill of all the volatile oils. Ettling says it consists of carbon, 74.6279, hydrogen 8.1531 and oxygen 17.2189. It appears to be a mixture of two oils, one a light, colorless oil, $C_{20}H_8$, of sp. gr. 0.918, not combining with bases, but absorbing hydrochloric acid gas without yielding a crystalline compound. The other a heavy oil $C_{24}H_{15}O_5$, colorless, but becoming colored by age, having the sp. gr. 1.079, which forms crystalline salts with alkalies, and is consequently termed *caryophyllic* or *eugenic acid*; it is reddened by nitric acid. These two oils may be obtained separately, by distilling the crude oil from a solution of potassa; the light oil passes over with watery vapor, the heavy remains with the potassa from which it may be obtained by distillation with phosphoric or sulphuric acid.

The properties which this oil possesses, afford great opportunity for discovering its purity. Firstly, its relation to the alcoholic solution of caustic potassa, with which it congeals entirely into a crystalline mass, totally losing at the same time the clove odor. Any foreign substance present would be excluded from this mass, or would interrupt and weaken it. Similar to this, and equally marked, is the butyraceous coagulum, which is obtained by shaking the oil with a solution of caustic ammonia, and which, after fusion, crystallizes. The spontaneous ready decomposition by nitric acid, and simultaneous formation of a reddish-brown solid mass, as also the dark-blue coloration of the oil by a small quantity of sulphuric acid, while a greater proportion of the latter acid changes the oil into a blood-red solid mass, are equally striking tests. To these, we may add the perfect decomposition of the oil into brown flakes by chromate of potassa, accompanied by the loss of the yellow color of the solution of this salt; the solubility of iodine, which forms with it a liquid extract, with but a small increase of temperature, and also the perfect and easy solubility of santaline in it.—*Zeller.*

Properties and Uses.—Oil of Cloves is stimulant and irritant, and is much used as a corrector of other medicines, and as an external counter-irritant. It is frequently inserted on cotton into the cavity of a carious tooth to alleviate toothache. Its dose is from two to five drops on sugar, or in emulsion.

Off. Prep.—Mistura Cajuputi Composita; Mistura Olei Camphorata; Pilulæ Aloes Compositæ.

OLEUM CHENOPODII. *Oil of Wormseed.*

History.—Oil of Wormseed is prepared in this country; that which is procured from manufacturers near the city of Baltimore is the most esteemed. It is obtained by distillation of the bruised seed or ripe tops of the plant with water, and when first obtained is of a light yellow color, but becomes darker by age. It possesses the odor and taste of the plant, and has the specific gravity of 0.908. An oil of less strength is prepared in the Western States from the leaves, stalks, and seed of the matured plant, and, probably, possesses similar properties when given in larger doses. That from the seeds always commands the highest price. Thirteen ounces of the seeds gave three and a half drachms of volatile oil, according to Engelhardt. The oil is soluble in alcohol and ether; it absorbs large quantities of chlorine, attended with augmented heat, and liberation of hydrochloric acid gas; it does not explode with iodine, and leaves a resinous mass when distilled from caustic potassa. According to Volckel it consists of an oil $C_{12} H_{10} O$, of sp. gr. 0.919, which is readily soluble in alcohol and ether, and which boils at 347° F.; also another oil, which can not be obtained pure, but contains still more oxygen.

Properties and Uses.—This oil is used only as an **anthelmintic.** Its dose is from three to six drops for a child, repeated twice a day for four or five days, and then followed by an active cathartic. It forms the basis of several popular nostrums for worms.

Off. Prep.—Mistura Chenopodii Composita; Mistura Olei Composita.

OLEUM CINNAMOMI. *Oil of Cinnamon.*

History.—Oil of Cinnamon is obtained in Ceylon, by macerating the bark reduced to a gross powder, in sea-water for two days, adding muriate of soda, and then distilling off the water. About a third of the oil floats, and the rest sinks in the water which comes over; and the whole amounts on an average to eight ounces from eighty pounds, Avoirdupois, of recently prepared cinnamon. The color of Oil of Cinnamon is wine-yellow, which slowly passes to cherry-red.—*C.* Its taste is at first sweetish, afterward cinnamonic, burning, and acrid. It is readily soluble in alcohol, and has its specific gravity varying from 1.038 to 1.041. By exposure to the air, it attracts oxygen, and crystals slowly form, which are called *cinnamic acid* $C_{18} H_7 O_3$; these are found in old Oil of Cinnamon, and have an acid taste, are volatile, soluble in alcohol, sparingly so in water, and are decomposed by nitric acid, forming at first oil of bitter almonds, and finally depositing benzoic acid. Two resins and water are also formed by exposure of the oil to the atmosphere; one of the resins is $C_{12} H_5 O$, the other $C_{30} H_{15} O_4$. Concentrated nitric acid added very gradually to avoid violent reaction, converts Oil of Cinnamon into a mass of white crystalline scales, supposed to be a nitrate, or a salt in which the oil acts the part of a base. With ammonia the oil unites to form a crystalline solid amide, called cinnhydramide, $C_{54} H_{24} N_2$. Cinnamon Oil is a complex substance, its principal constituent being a *hydruret of cinnamyle*, $C_{20} H_{11} O_2$, which is, in fact, the oil proper. M. Strecker, some years ago, ascertained that *styrone*, the oily liquid obtained by distilling purified storax with potassa, was the alcohol of cinnamic acid. He has recently proved that when styrone is treated with platina black, as in making common aldehyde, the product is pure Oil of Cinnamon, which is the *aldehyd of cinnamic acid;* styrone, $C_{18} H_{10} O_2$, by absorbing O_2, becomes $C_{18} H_8 O_2 + 2\,HO$.

Oil of Cassia, or Chinese Oil of Cinnamon, very much resembles the Ceylon oil in color, odor and taste, but it is much inferior. Its chemical reactions are similar to those of the Oil of Cinnamon, as well as its medicinal virtues.

With Oil of Cinnamon, the question is not merely to detect adulterations with other oils, but also to distinguish the two sorts of this oil from one another, viz: the Ceylon oil (*true Oil of Cinnamon*), and the Chinese oil (*oil of Cassia*), which differ very much in price. In both cases it is difficult to obtain accurate tests of the properties of these oils, as they are almost exclusively obtained by way of commerce, and vary considerably in their qualities, on account of their age and careless method of preparation.

The chief distinction between the two oils is the odor—the Ceylon oil is moreover more liquid, and of a less specific gravity than the Chinese, and may be exposed to a greater degree of cold than the latter without becoming turbid. The most distinguishing characteristic of the cinnamon oils is, perhaps, their relation to the alcoholic solution of caustic potassa, both dissolve in it readily and clear, with a reddish yellowish-brown color; after some time, however, the solution becomes very turbid, and a rather heavy, undissolved oil precipitates, while the solution gradually becomes clear again.

Another peculiar character is, where the oil is being decomposed by nitric acid, a smell of bitter almond is perceptible. Both oils are at the same time converted into a brown balsam; in the Ceylon oil a brisk decomposition occurs sooner, and at a slighter heat. Iodine dissolves rapidly in the Ceylon oil with a considerable increase of heat, and a slight expulsive movement, a tough extract-like substance remaining behind. With the Chinese oil the reaction is slow, the development of heat but very slight, quiet, and the residue a soft or liquid substance. Chromate of potassa decomposes partially the Ceylon oil into brown flakes, which are suspended in the solution. This is deprived of its yellow color, while the undecomposed portion of the oil assumes a yellowish light-red color, and becomes thick. The solution, treated with Chinese oil does not entirely lose its yellow color, contains no flakes, and the oil is turbid emulsive-like, and does not become clear again. Sulphuric acid also furnishes a good test for these oils; the Ceylon oil forms with it a solid, hard mass, changing from a brownish green into deep black; in the Chinese oil, this substance is softer and deep olive green. A smaller quantity of acid colors the oils purple red, while muriatic acid imparts to them a violet color.—*Zeller.*

Properties and Uses.—Oil of Cinnamon is stimulant, aromatic, antispasmodic, and carminative. It is frequently used to modify the taste of medicines, and is given as a stimulant in flatulent colic, cramp of the stomach, paralysis of the tongue, etc. It undoubtedly exerts an influence upon the uterus, and will be found valuable in uterine hemorrhage, in the form of alcoholic tincture. The tincture of the bark is frequently administered for this purpose, but I know from experience, that although destitute of astringency, yet the tincture or essence of the oil has the same, if not a better action, in such cases; again, it is an unsafe remedy to exhibit during pregnancy, as it is very apt to produce miscarriage. The essence, or even cordial of cinnamon, stimulates the generative organs, and produces an aphrodisiac influence. The dose of Oil of Cinnamon is one or two drops, given in emulsion; of the essence from half a fluidrachm to a fluidrachm, given in a wineglass of sweetened water. Ten drops of Oil of Cinnamon added to a fluidrachm of olive oil, gently heated, and rubbed upon the spine, will frequently quiet a restless, fretful child suffering with flatulence or colic, and cause it to sleep; if the rubefacient power requires to be increased, ten drops of aqua ammonia may be added.

OLEUM COPAIBA. *Oil of Copaiba.*

Preparation.—"Take of Copaiba *one ounce;* Water *a pint and a half* (Imp. Meas). Distill, preserving the Water; when most of the Water has passed over, heat, return it into the still, and resume the distillation; repeat this process so long as a sensible quantity of the oil passes over with the Water."—*Ed.*

History.—The more recent the copaiba the greater is the amount of volatile oil obtained. Usually about 33 or 50 per cent. of the copaiba is procured in oil, and it is stated that one specimen yielded 80 per cent.—*Am. Jour. Pharm. XXII.*, 289. When the oil has been rectified and freed from water, it is colorless, has an acrid taste, and the peculiar aromatic odor of copaiba; its specific gravity is 0.878. It is soluble in alcohol, ether, and sulphuret of carbon; its boiling-point is 470°; it absorbs hydrochloric acid gas, and artificial camphor is deposited in crystals. Potassium may be preserved in it unchanged. When dropped on iodine, heat and hydriodic acid are suddenly produced. It dissolves sulphur, iodine, and phosphorus, and is converted into a resinous substance by nitric and sulphuric acids. It seems identical in composition with pure oil of turpentine, being composed of $C_{10}H_8$.

Small proportions of oil of turpentine can not easily be detected in this oil, as both react, in most cases, in the same manner. A chief distinction is the weaker fulmination of the Oil of Copaiba, as also the circumstance that the latter requires double the quantity of alcohol for its solution, which, notwithstanding, still remains turbid; also, its relation to sulphuric acid is somewhat different; the latter becomes yellowish brown-red, but turpentine-oil lively yellowish-red.—*Zeller.*

Properties and Uses.—The Oil of Copaiba exerts an influence upon the system, similar to that of copaiba, to which it is preferred on account of the smaller dose required, and its non-tendency to cause nausea. It enters into many of the nostrums of the day for the cure of gonorrhea. The dose is ten or twenty drops, which should be given in syrup, peppermint or cinnamon-water, mucilage, or emulsion.

OLEUM CUBEBÆ. *Oil of Cubebs.*

History.—Cubebs ground, and distilled with water, furnish about seven per cent. of this oil. It is a thick, colorless oil, but as commonly met with has a greenish or yellowish tint. It possesses the peculiar taste and odor of the berries, is lighter than water, being of specific gravity 0.929, and thickens on exposure to the air without being deprived of its odor; occasionally it deposits crystals, which are supposed to be a hydrate of the oil. It is composed of carbon and hydrogen, $C_{15}H_{12}$.

Oil of Cubebs is devoid of oxygen, and differs from other oils having a similar composition, by its viscidity and weak action upon iodine, which imparts to it, at the beginning of the reciprocal action, a violet-color.

Even absolute alcohol, in large proportions, and at a high temperature, forms a solution which is mostly clear; equal weights produce a very turbid solution, throwing down flakes. The oil, which is strongly clouded by nitric acid, becomes by heat only pale-red, but is decomposed and converted into a consistent resin. Sulphuric acid assumes a red color, the oil becoming crimson. These characteristics will suffice for this oil, which is already difficult to be adulterated on account of its viscidity and want of color.—*Zeller.*

Properties and Uses.—Oil of Cubebs may be substituted for the powdered berries, in many instances with benefit. It is less pungent than the oleo-resin or fluid extract, and is, probably, only one of the active principles of cubebs. The dose is ten or twelve drops, three times a day, gradually increased, as the stomach will permit, or until it produces some decided results. It may be given in syrup, emulsion, or in the form of capsules, like copaiba.

OLEUM ERECHTHITI. *Oil of Fireweed.*

History.—This oil is obtained by distilling the plant Erechthites Hieracifolius with water. As obtained in the shops it is quite fluid, transparent, yellowish in color, of a strong, peculiar, fetid and slightly aromatic odor, and a fetid, bitterish, burning taste. In its odor and taste it somewhat resembles the oil of fleabane. It is soluble in alcohol. No analysis has been made of it.

Properties and Uses.—The therapeutical actions of Oil of Fireweed are not well understood. It seems to resemble the oil of fleabane in its influence upon various hemorrhages, and for which agent it is frequently substituted, and is considered by many to be the most efficacious, in such cases, of the two oils. It also exerts a beneficial effect on mucous surfaces, and has been successfully used in diarrhea, dysentery, hemorrhoids, etc. As an antispasmodic it has been found of value in spasms of the stomach and bowels, colic, hiccough, hysteria, and pertussis. It is chiefly employed for the same purposes as the oil of fleabane. The dose is from five to twenty drops on sugar, or in emulsion. When triturated with the extract of stramonium, Oil of Fireweed is said to form a valuable preparation for piles.

OLEUM ERIGERONI. *Oil of Fleabane.*

History.—This is obtained by distillation of the leaves and flowers of Fleabane with water. When first obtained it is said to be of a light-yellow color, and transparent. The specimen which I have before me is about six years old, it is quite fluid, of a wine-red color, clear, with a peculiar, rather pleasant, aromatic, mint-like odor, and an aromatic, bitterish, not very agreeable, penetrating taste; both the odor and taste recall to mind those of oil of spearmint, combined with oil of amber. The only change I have noticed in the oil in my possession is a deposit of a reddish color, resembling currant-jelly, soft, tenacious, in flat or tubular scales or crystals, and which I have not had an opportunity of analyzing. This deposit burns when brought into contact with flame, giving off a dense smoke, with an odor resembling that of cedar. The oil has not been analyzed. Prof. Procter, of Phila., examined a specimen of a light straw-color, very limpid, with a peculiar aromatic, not unpleasant odor, somewhat analogous to oil of hemlock, and very persistent; its taste, peculiar, mild, and not very pungent; its specific gravity 0.845. It was very inflammable, burning with an abundant sooty flame, boiling at 310° F., and continuing rising till 365°, showing that there must be two volatile oils. It distills *per se*, unchanged and colorless, leaving a small oleo-resinous residue in the retort. Potassium acts on it, eliminating gaseous matter, which continues until the metal disappears; the oil at first assumes a reddish-brown color, which becomes deeper, and finally deposits a gelatinous residue, which is probably a resinate of potassa. The oil is, therefore, highly oxigenous. Hydrate of potassa slowly turns oil of erigeron red; iodine combines with it without exploding; fuming nitric acid acts slowly at 60°, but when heated, explosively; sulphuric acid instantly decomposes it. It is very soluble in ether and absolute alcohol, but moderately in commercial alcohol 0.835.—*Am. Jour. Pharm. XXVI.*, 502.

Properties and Uses.—Oil of Fleabane is stimulant and carminative, with scarcely any perceptible astringency. It appears, notwithstanding, to exert a very remarkable influence on the system in hemorrhages, to check which it is chiefly used. It is said to be of superior value in all hemorrhages, but more especially when from the uterus. Further investigations with this remedy are required, in order to know its proper therapeutical actions. The dose is from two to ten drops, dissolved in alcohol, and administered in mucilage or sweetened water. Combined with five or six parts of castor-oil, or of stramonium ointment, it forms a valuable application to piles. (For further uses, see Erigeron Canadense, part I., page 391.)

OLEUM FŒNICULI. *Oil of Fennel.*

History.—Oil of Fennel is prepared from Fennel-seeds, by distillation with water; it is colorless or pale-yellow, possesses the peculiar taste and odor of the fruit, is crystallizable at 50°, and has a specific gravity of 0.997 to 0.999. Nineteen cwt. of the seeds yield 78 lbs. of oil. The oil contains *Stearoptene* and *Eleoptene*, the former of which is identical in composition with that obtained from oil of anise. It consists of carbon 13 equivalents, hydrogen 8, and oxygen 2.

The oil employed in this country is imported, but is not very uniform in its character, and which is supposed by some to be owing to its being the product of different plants or species. One specimen examined by Dr. Montgomery remained fluid at 22°.

Properties and Uses.—Oil of Fennel is principally used as a carminative, and for the purpose of correcting or concealing the unpleasantness of other medicines. The dose is from five to twenty drops.

OLEUM GAULTHERIÆ. *Oil of Wintergreen.*

History.—Oil of Wintergreen is prepared by distilling the plant with water; when first procured it is nearly colorless, but becomes more or less of a deep-yellow or red color by age. It has a peculiar and agreeable odor, and a sweetish, somewhat pungent, peculiar taste. Its specific gravity is 1.173, being the heaviest of the volatile oils, and it boils at 412°. It possesses acid qualities, and has, according to Cahours, the same composition as the salicylate of methylene. Its purity may be determined by its great specific gravity. The greater part of the oil used in this country is made in New Jersey. It is soluble in alcohol and ether, and slightly so in water.

This oil is not peculiar to the Gaultheria alone, but has been detected in the bark of *Betula Lenta*, the root of *Polygala Paucifolia*, and the stems and roots of *Spirœa Ulmaria*, *Spirœa Lobata*, and *Gaultheria Hispidula.*—*Am. Jour. Pharm.*, *XIV.*, 211, and *XV.*, 241.

Properties and Uses.—This oil is stimulant and aromatic, and is principally employed to correct or disguise the taste of other medicines. The essence, or the oil dissolved in alcohol is stated to have been found effectual in curing intermittent fever. The dose of the oil is from five to ten or fifteen drops on sugar, or in emulsion.

OLEUM HEDEOMÆ. *Oil of Pennyroyal.*

History.—This oil is obtained from the *Pennyroyal* plant of this country, by distillation with water. It is of a pale yellow color, with the agreeable odor of the plant, and its warm, pungent taste, and has the specific gravity 0.948.

Properties and Uses.—Oil of Pennyroyal is a stimulant, carminative, antispasmodic, and emmenagogue. It has been used with benefit in cramp of the stomach, flatulent colic, nausea, amenorrhea, and to diminish the harshness of griping, as well as nauseating medicines. It is frequently employed for the purpose of occasioning abortion, but as with all agents of this sort, it is very dangerous. It is sometimes applied externally as a mild rubefacient. The dose is from two to ten drops on sugar, or in emulsion.

OLEUM JUNIPERI. *Oil of Juniper.*

History.—Oil of Juniper is procured from the bruised berries by distillation with water; it may likewise be procured from the leaves. The full grown green fruit yields more oil than the ripe, as in the process of ripening the oil becomes converted into resin. The oil is colorless, or pale-greenish, limpid, transparent, lighter than water, and causes the left-handed rotation of polarized light; its specific gravity is variously given at 0.839, and 0.911. It has the odor of the fruit, and an aromatic, balsamic taste, and dissolves with difficulty in alcohol. It consists of oils or carburets of hydrogen, $C_{20} H_{16}$; one colorless and more volatile; the other colored, and less volatile. Both form crystalline hydrates, when agitated with a solution of salt. The more volatile oil, almost entirely constitutes the oil obtained from the ripe fruit; it is soluble in alcohol and in hydrochloric acid, with which it forms a liquid artificial camphor.—*P.* When Oil of Turpentine is added to Oil of Juniper, the specific gravity of this adulterated oil is much less than that of the pure oil.

Properties and Uses.—Oil of Juniper is a stimulant diuretic, and is frequently employed to arrest chronic mucous discharges, especially from the urethra. It may also be used in cases of dropsy as a diuretic, combined with other agents. The dose is from five to fifteen or twenty drops. The peculiar taste and diuretic property of Holland Gin is owing to the presence of this oil.

Off. Prep.—Pilulæ Saponi Compositæ.

OLEUM JUNIPERI VIRGINIANA. *Oil of Cedar.*

History.—This oil is prepared by distillation of the tops and leaves of Red Cedar with Water. It is quite fluid, transparent, of a light yellowish or reddish color, but becoming of a wine-red color by age, possesses the peculiar odor, with the nauseous, bitterish, warm taste peculiar to the leaves, in a concentrated degree. Upon standing, but very little deposit ensues; in a specimen before me of sixteen years' standing, and about a pint in quantity, can be observed a very slight deposit of confluent whitish granules or scales, somewhat resembling white wax.

Properties and Uses.—Internally this oil is stimulant and emmenagogue, possessing properties similar to those of the oil of savin; however, it is very seldom administered internally. It is chiefly used as a rubefacient, and forms an excellent local application in inflammatory rheumatism and other painful affections, either alone or combined with other articles to form a liniment. The dose, internally, is from two to ten drops, on sugar.

Off. Prep.—Linimentum Olei.

OLEUM LAVANDULÆ. *Oil of Lavender.*

History.—Oil of Lavender is procured from the flowers of Lavender, by distillation with Water; about one pound of oil is obtained from 50 to 70 lbs. of the flowers. Oil of Lavender is of a pale-yellow color, a pure, grateful, lavender odor, and a bitter, aromatic, camphoraceous taste. Its specific gravity varies from 0.877 to 0.905. It is soluble in alcohol of sp. gr. 0.830, and imperfectly so in acetic acid, boils at 397° F., and according to Kane consists of $C_{15} H_{14} O_2$. When the oil is distilled from the leaves, stalks, and flowers, its specific gravity is stated by Brande to be 0.920. Upon exposure to the air it absorbs oxygen to the amount of about 120 volumes in four months and a half. It consists of a fluid oil or *Eleoptene*, and a solid substance or *Stearoptene*, the latter of which is isomeric with laurel-camphor.

Oil of Lavender suffers no other admixture but that of alcohol, without becoming worthless, and in the inferior cheap qualities which are sold, the presence of alcohol is discoverable by the specific weight. Of seventeen samples examined, the lowest sp. gr. of the inferior oil was 0.86; that of the best qualities, mostly 0.87 to 0.89. The peculiar character of Oil of Lavender by which it is distinguished, with regard to the degree, from all oils obtained from the Labiatæ, is its quick and violent fulmination with iodine, and the entirely changed, pungent, acido-balsamic smell of the soft, extract-like residue. This character is invariably observed in all genuine lavender-oils, both commercial and those prepared in the laboratory. The inferior, cheaper, commercial sort, does not fulminate. An intentional addition of one-third of alcohol did not perceptibly weaken the fulmination ; also, one-half of alcohol did not destroy, but only weaken it; an equal volume of alcohol being added to the oil, no fulmination took place, but a lively ebullition and development of yellowish-red vapors. A moderate proportion of alcohol, can not, therefore, be discovered by these reactions; for this purpose, the almost indifferent relation of the pure oil to santaline is a safer guide, as that containing alcohol dissolves the santaline readily and quickly. An adulteration with fulminating oils, which in this case can not be detected by iodine, would be discovered by the differing relation to caustic potassa. The alcoholic solution of the latter forms a clear solution with lavender-oil, to which it communicates a dark, yellowish red-brown color, while the other oils are dissolved in it with difficulty, and become turbid, with but a slight coloration. Among the better tests, we may also reckon the deep reddish-brown color produced by sulphuric acid, accompanied by a strong inspissation, while the equally colored acid has a slight shade of yellow.—*Zeller.*

The broad leaved variety of Lavender, *Lavandula Spica*, furnishes the *Oil of Spike;* it is not so fragrant as the preceding oil, and bears some analogy to oil of turpentine. It is chiefly used in the manufacture of varnishes for artists, and in painting on porcelain.

Properties and Uses.—Oil of Lavender possesses stimulant and carminative properties, and is sometimes administered in hysteria, nervous debility and headache. Its fragrance renders it an important article in perfumery, in which it is principally used. Its dose is from one to six drops.

Off. Prep.—Tinctura Lavandulæ Composita.

OLEUM LIMONIS. *Oil of Lemons.*

History.—Oil of Lemon is obtained by lightly grating the fresh rind of the lemon, placing it in a fine cloth-bag, and then subjecting it to pressure; the sediment is allowed to settle, and the clear oil is poured off.—*C.* It may also be procured by distillation, but this mode is not pursued, as it gives a less fragrant oil. The oil is imported from the southern parts of Europe, as Italy, Portugal, etc.

It is of a pale-yellow color, but may be rendered colorless by distillation, has a rich lemon odor, a warm, aromatic, penetrating taste, and is very volatile. Its specific gravity is 0.8517, but is reduced to 0.847, by distillation of about three-fifths of it. In pure or anhydrous alcohol it dissolves in all proportions, and is soluble in seven or eight parts of ordinary alcohol. The pure oil is isomeric with pure oil of turpentine, consisting of ten equivalents of carbon, and eight of hydrogen, and forms by absorption of muriatic acid gas a solid substance of a crystalline character, and an oily fuming liquid of a yellow color. The solid substance is composed of one equivalent of oil, and one of acid, and is analogous to the artificial camphor formed from oil of turpentine, the latter of which has the formula $C_{20}H_{16}HCl$, while that from the lemons is $C_{20}H_{8}HCl$. When cooled to 8° F., Oil of Lemon deposits some crystals, and when exposed to the air it absorbs oxygen.

It is frequently adulterated by alcohol, the fixed oils, or more frequently by oil of turpentine. Alcohol may be detected by the milky fluid which forms upon agitating the oil with water. The fixed oils may be known by leaving a permanent stain upon paper, which is not the case with the genuine oil. Oil of turpentine may be detected by the turpentine odor evolved when the impure oil is evaporated from heated paper. M. Biott states that the camphor formed by the Oil of Lemons exercises no action on polarized light, while the oil itself rotates a ray to the right. On the contrary, the camphor from oil of turpentine exercises a power similar to that possessed by the isolated oil, of rotating to the left. These molecular properties establish a difference between the two oils, and may serve to detect adulteration and fraud.

In order to remove mucilaginous and other matters existing in the Oil of Lemons, it is recommended by J. S. Cobb, to agitate the oil with a little boiling water, and to allow the water to remain in the bottle. A mucilaginous mixture forms on the top of the water, and acquires a certain tenacity, so that the oil may be poured off nearly to the last, without disturbing the deposit. The gradual decomposition of the oil, he supposes to be owing to the presence of these impurities, which enter during the process of expression and decantation. He recommends that the oil, as well as all other essential oils, should be kept in a cool, dark place, where no very great changes of temperature occur.

Properties and Uses.—Stimulant and aromatic. Its chief use is in perfumery, and to impart an agreeable flavor to medicines. It has been recommended in certain affections of the eye, as a local application. A very agreeable drink for the summer and for febrile patients may be made of White Sugar four ounces, Oil of Lemon ten drops, triturate together, and add Citric Acid two drachms; a teaspoonful of this to a tumbler of water forms a pleasant, refreshing draught. Tartaric acid may be substituted for the citric, if desired.

OLEUM MENTHÆ PIPERITÆ. *Oil of Peppermint.*

History.—Oil of Peppermint is obtained by distilling the herb with water; which yields from the one hundred and seventieth to the three hundredth part of the oil. When fresh it is nearly colorless, or light greenish-yellow, but becomes darker and even reddish by age. It has the strong aromatic odor of the plant, together with its warm, aromatic, camphorous taste, is of the specific gravity from 0.899 to 0.920, and is soluble in alcohol. When taken into the mouth and air inhaled, a sensation of cold is produced. At 365° it boils, and at —8° it deposits fine needle-like crystals of *Stearoptene*, which are said to have the same constitution as the oil; these crystals are also deposited at ordinary temperatures, on long standing. The composition of the oil is $C_{20} H_{20} O_2$. Its adulterations with alcohol and oil of turpentine are not infrequent; the latter may be known by the turpentine odor, by the imperfect solution it forms with alcohol, and by its fulmination when iodine is added to it; the former may be known by the dirty white liquor formed by adding an equal volume of water to it. It dissolves iodine slowly and without increased heat. Any adulteration of this oil, except with alcohol or other mint oils, may be easily detected by its peculiar odor and taste. The presence of alcohol is betrayed by the specific weight, which is seldom under 0.90, and which must be considerably lower, if the alcohol be stronger. The most distinguishing character which the peppermint-oil shares with no other oil of the Labiatæ, though with some of the Compositæ, is, its relation to chromate of potassa, which communicates to it a deep red-brown color, and inspissates it into a coagulum more like an extract than a resin, and by agitation is divided into a flaky form, while the solution of the salt soon loses the whole of its yellow color, or appears yellowish-green. The purple-red color imparted to the oil by the fourth part of its volume of nitric acid, is, at least for the qualities of 0.89 to 0.90 very characteristic. The other oils, which become merely brown, show at least a tendency to red, but all, upon an addition of acid at a higher temperature, change to reddish-brown and into a liquid balsam.—*Zeller*. Oil of Peppermint is extensively manufactured in this country.

Properties and Uses.—Oil of Peppermint is a powerful diffusible stimulant, with carminative, antispasmodic, and anti-emetic properties. It is much employed to relieve flatulence, gastrodynia, nausea, spasms of the stomach and bowels, and to cover the taste of other drugs. Externally, it is occasionally employed as a rubefacient. It enters into a liniment, which at one time was a popular remedy for various painful local affections; it is composed as follows: Take of Oil of Olives, Oil of Peppermint, Oil of Turpentine, Tincture of Opium, Alcohol, Aqua Ammonia, each, one fluidounce; mix. To be applied three or four times a day. It is commonly used under the name of *Essence of Peppermint*, which is a tincture of it. The dose of the oil is two to ten drops on sugar.

Off. Prep.—Aqua Menthæ Piperitæ; Mistura Cajuputi Composita; Tinctura Olei Menthæ Piperitæ.

OLEUM MENTHÆ VIRIDIS. *Oil of Spearmint.*

History.—By distillation of Spearmint herb with water, from the one hundred and seventieth to the five hundredth part of a pale-yellow or greenish oil is obtained. It reddens with age, has the peculiar odor and taste of the herb in a strong degree, is less agreeable than oil of peppermint, is soluble in alcohol, boils at 320°, and is of the specific gravity varying from 0.914 to 0.975. According to Kane its composition is represented by the formula $C_{35} H_{28} O$. It is extensively prepared in this country.

Properties and Uses.—Oil of Spearmint is carminative, antispasmodic, and diuretic. It is used very frequently as a substitute for the oil of peppermint, and is more often prescribed on account of its diuretic properties. The dose of the oil is five or ten drops on sugar.

Off. Prep.—Aqua Menthæ Viridis; Pilulæ Saponi Compositæ; Pilulæ Taraxaci Compositæ; Tinctura Olei Menthæ Viridis.

OLEUM MONARDÆ. *Oil of Horsemint.*

History.—Oil of Horsemint is extensively manufactured in this country from the fresh herb, by distillation with water. It is of a yellowish or brownish amber color, having a penetrating, aromatic odor like that of the plant, and a strong, pungent, somewhat acrid taste; and is soluble in alcohol. C. T. Bonsall states that when exposed to 40° F., in the presence of moisture, a camphor is deposited, which when separated from the oil, and distilled over dry chloride of calcium, crystallizes in large oblique rhombic prisms, composed of transparent plates. This camphor melts at 118° F., boils at 426° F., and then solidifies upon slight agitation at 82° F. Nearly all the oil is converted into this solid substance. *Monardin* has been proposed as a name for this camphor, or stearoptene, as it has been called.—*Am. Jour. Pharm. XXV.*, 200. Its odor is like that of thyme, it is soluble in alcohol and ether, and has the formula $C_{10}H_7O$. The *elénptène* or fluid oil of monarda oil, has a yellowish-red color.

Properties and Uses.—Oil of Horsemint is stimulant antispasmodic, and anti-emetic, and in the form of the essence, has been much used to allay nausea and vomiting in Asiatic cholera, cholera-morbus, etc., its action in these cases being prompt and permanent. The dose of the oil is from two to five drops on sugar; of the essence, from ten to thirty drops in sweetened water. Externally, it is rubefacient and even vesicant, and has been advantageously used in low forms of fever, cholera-infantum, paralysis, rheumatic and neuralgic pains, etc. It soon causes rubefaction when locally applied, affording in many instances almost immediate relief.

OLEUM ORIGANI. *Oil of Origanum.*

History.—This oil is procured from the *Origanum Vulgare*, by distillation of the plant with water. On an average two hundred weight of the plant yields about one pound of oil. It is of a yellowish, or reddish-yellow color, of a peculiar, agreeable, balsamic odor, and a warm, very pungent taste. According to Kane it boils at 354° F., is of specific gravity 0.867, and has the formula $C_{50}H_{40}O$.—*P.* It is imported from Europe, and frequently contains oil of turpentine. The *Oil of Sweet Marjoram*, obtained by distillation of the *Origanum Majorana*, is a pale-yellow or brownish oil with the strong odor and taste of sweet marjoram, and on standing deposits a camphor. It is seldom used in the United States.

Properties and Uses.—Oil of Origanum is stimulant and rubefacient, and is chiefly employed in the form of liniment as an application to various parts suffering from painful affections. As with many other essential oils, it affords relief in toothache upon being applied to the decayed tooth by means of lint or cotton. It is very seldom administered internally.

Off. Prep.—Linimentum Capsici Compositum; Linimentum Olei Compositum; Linimentum Saponis Camphoratum; Tinctura Camphoræ Composita.

OLEUM PIMENTÆ. *Oil of Pimento.*

History.—When Allspice or Pimento berries are bruised and distilled with water, they yield a volatile oil in the proportion of 41 lbs. 6 oz. of oil from one cwt. of the berries, or nearly 6 per cent. It is at first without color or nearly so, but becomes reddish-brown by age. Its odor is somewhat similar to that of cloves, and its taste acrid. It is reddened by nitric acid, and its properties are almost identical with those of oil of cloves. It is heavier than water, its density being given as 1.021. It is composed of two oils; by distillation with caustic potassa the *light oil* is obtained; the residue, mixed with sulphuric acid and distilled gives out the *heavy oil.* The first appears to possess properties similar to the light oil of cloves; it floats on water and on liquor potassa, and is slightly reddened by nitric acid. Potassium sinks in it with scarcely any action upon it. The heavy oil, *pimentic acid*, is identical with caryophyllic acid; it forms crystalline compounds, with the alkalies; is reddened and violently acted on by nitric acid; and becomes blue or greenish on the addition of tincture of chloride of iron.—*P.*

Properties and Uses.—Oil of Pimento is stimulant and aromatic, and may be used for similar purposes as the other oils of like character, in doses of from two to ten drops.

Off. Prep.—Aqua Pimentæ.

OLEUM ROSÆ. *Oil, or Otto of Roses.*

History.—Oil of Roses, is manufactured in Egypt, and in various Asiatic countries, by distilling roses with water; on cooling the oil forms a film upon the surface of the water. Not quite three drachms of oil are obtained from a hundred pounds of rose-leaves, on which account it is a very high priced oil. It is said also to be procured by putting the petals in water, and placing them so that the sun can act upon them, when the oil slowly passes out and floats on the top of the water. The roses from which it is procured are the Rosa Centifolia, R. Damascena, and R. Moschata; the manufacturing season is in March and April. It is imported from Constantinople and Smyrna, and, generally, in bottles holding from 20 to 60 minims.

It is usually almost colorless, but color is no criterion of its goodness or purity; sometimes it is at first greenish, and afterward presenting reddish, yellowish or greenish tints. It has an intense, and most penetrating, diffuse odor, too powerful to be agreeable when undiluted. It fuses at between 84° and 86° F., becomes a crystalline solid below 80°; it is soluble in about 150 parts of alcohol, and has the specific gravity 0.832 at 90° F. It consists of $C_{23}\ H_{23}\ O_3$. It is combustible, and its vapor forms an explosive mixture with oxygen. Two oils enter into its composition, one a liquid, *eléoptène*, the other a solid, *stéaroptène.* They may be separately obtained by compressing the frozen oil between folds of blotting-paper. The paper absorbs the eléoptène, and leaves the stéaroptène or rose-camphor, which is in crystalline plates, insoluble in alcohol, fusible at about 95° F., and composed of equal number of equivalents of carbon and hydrogen.

Owing to its high price Oil of Roses is often adulterated; the additions to it are sandal-wood oil, and other essential oils, spermaceti, fixed oils, etc. If it be adulterated with volatile oils, these will not congeal at 80°, and if fixed oils, etc., be used, they will not wholly evaporate from blotting-paper, with a gentle heat, and will impart an oily stain to it.

Properties and Uses.—Oil of Roses is used altogether as a perfume, and is frequently added to cerates, ointments, liquors, etc., for the purpose of rendering them fragrant.

Off. Prep.—Aquæ Rosæ.

OLEUM ROSMARINI. *Oil of Rosemary.*

History.—When the recent Tops of Rosemary are distilled with Water, they yield a volatile oil in the proportion of about one drachm of oil from one pound of the herb. Oil of Rosemary is transparent and colorless, with the odor of rosemary, and a hot, aromatic, camphorous taste. It is soluble in all proportions in alcohol of 0.830, but it requires forty times its weight of ordinary alcohol to dissolve it. It boils at 365°, has the sp. gr. 0.897, and formula $C_{45} H_{38} O_2$.—*Kane.* Exposed to the air, it gradually precipitates crystals, *stéaroptène*, which resemble camphor, and amount to about a sixteenth of the oil by weight. An impure article, composed of oil of rosemary and spirits of turpentine, is well known in the shops; the rosemary oil may be separated from the turpentine by alcohol, by which it is dissolved.—*T.* See tests for purity of Oil of Cajeput, page 1184.

Properties and Uses.—Oil of Rosemary is stimulant and rubefacient; it is principally employed, however, in perfumery. A very pleasant *Cologne* may be made as follows: Take of Oil of Rosemary, Oil of Lemon, each, *two fluidrachms;* Oil of Lavender, Oil of Bergamot, of each, *one fluidrachm;* Oil of Cinnamon, Oil of Cloves, Oil of Roses, of each, *eight minims;* Alcohol *one pint.* Mix, agitate well, and after allowing the mixture to stand for a few days, with frequent agitation, filter. The dose of Oil of Rosemary is from two to ten drops.

Off. Prep.—Linimentum Opii; Linimentum Saponis Camphoratum.

OLEUM RUTÆ. *Oil of Rue.*

History.—The fresh Leaves and Tops of Rue, when distilled with Water, yield about seven grains in the thousand of a yellowish, acrid, heavy-smelling volatile oil, having the pure, intense, penetrating odor of the plant, of specific gravity 0.837, and boiling at 446°. It becomes gradually darker with age. Its composition is given as $C_{28} H_{28} O_3$.

The high price and strong smell of this oil lead to, and facilitate its adulteration. If prepared in the laboratory, this oil is distinguished by being slowly dissolved by iodine, unaccompanied by any external signs of reaction, and the formation of a slightly viscid liquid; by this means, adulterations with oils of Coniferæ, Aurantiaceæ, and most Labiatæ can be detected in it. Nitric acid acts but slowly upon it, and changes it into a greenish-yellow thin liquid balsam; chromate of potassa produces no reaction. By the turbid solution in alcohol, by the reddish-brown solution in liquor potassa, and by the similar but darker coloration which the oil and the acid assume by sulphuric acid, the cheaper oils of the Labiatæ may be easily detected in it.—*Zeller.*

Properties and Uses.—Oil of Rue is stimulant, antispasmodic, and emmenagogue. It has been used with advantage in hysteria, convulsions, pertussis, amenorrhea, and dysmenorrhea, in the dose of from one to five drops, three times a day. It is sometimes criminally used, for the purpose of producing abortion, in which it is highly dangerous, having been followed by fatal consequences.

OLEUM SABINÆ. *Oil of Savin.*

History.—When the Tops and Leaves of Savin are submitted to distillation with Water, they yield a yellowish, clear oil, having in an intense degree the peculiar odor of the leaves, and a bitter, acrid taste. The proportions of oil obtained, as given by authors, vary very much, being stated at from one to three per cent. According to Kane it boils at 315°, has the sp. gr. 0.915, and formula $C_{20}H_{16}$, being analogous to that of oil of turpentine. It effects the right-handed rotation of plane polarized light. Winckler mixed together equal parts of Savin Oil and concentrated sulphuric acid, and then distilled it from milk of lime, to remove the sulphurous acid, and obtained an oil very analogous to oil of thyme.

Properties and Uses.—Oil of Savin is an emmenagogue, and is seldom used for any other purpose, save as a liniment to the lumbar and sacral regions, and internally in amenorrhea, in which it is sometimes very efficacious. It also acts as a stimulant and abortivant. Ten drops of the oil on sugar, repeated three times a day, will, it is stated, positively produce abortion in from one to three weeks; but as with all other agents of this kind, is apt to be followed by very serious consequences. The dose of the oil, ordinarily, is from two to ten drops.

Off. Prep.—Tinctura Caulophylli Composita.

OLEUM SASSAFRAS. *Oil of Sassafras.*

History.—The Bark of the Root of Sassafras, when submitted to distillation with Water, yields from two to three per cent. of a heavy Volatile Oil, colorless at first, but gradually becoming yellow or red. It has a powerful, penetrating sassafras odor, and a warm, pungent, sassafras taste; its specific gravity is 1.094. When agitated with water, it separates like oil of parsley, into two portions, a fluid oil which swims on the surface of the liquid, and a heavier fluid oil which falls to the bottom. Nitric acid renders Sassafras Oil an orange-red color. Oil of Sassafras is soluble in alcohol, and dissolves caoutchouc. On standing for a long time, it deposits large crystals (stearoptène, *sassafrol* $C_{10}H_5O_2$), which are scarcely soluble in water, but dissolve readily in alcohol. They are not soluble in caustic potassa, acetic or muriatic acid, even with the aid of heat, and yield oxalic acid when treated with boiling nitric acid. Oil of Sassafras scarcely combines with the caustic alkalies, and becomes thick, opaque, and white when subjected to a current of chlorine gas; after neutralization with milk of lime, this thick mass furnishes on distillation a small quantity of camphor, identical with common camphor.—*Am. Jour. Pharm.*, *XXVI.*, 166. Oil of Sassafras is rarely adulterated in this country with oils of turpentine, cloves, or lavender.

Zeller states that it is distinguished from most other oils by the clear solution produced by iodine without inspissation. The green color which is at first produced by two parts of the oil and one part of sulphuric acid, is not produced with any other oil; by heat this color changes to blood-red. A greater quantity of oil produces in the heated acid a magnificent amaranth red color, while the oil itself appears only brownish or bluish red. With nitric acid the decomposition takes place without heat, and reddish-brown resin is formed, which, on being heated, becomes hard and brittle. The great specific gravity and the low degree of solubility in alcohol will easily lead to the detection of an admixture of the latter which would counteract these properties.

Properties and Uses.—Sassafras Oil is stimulant, diuretic, carminative, alterative, and diaphoretic. It may be used for all the purposes for which the bark is recommended. It is said to be an efficacious application to wens. It is much used as a local application to rheumatic and other pains. Its dose is from three to twelve drops on sugar, or in emulsion.

Off. Prep.—Emplastrum Resinæ Compositum; Linimentum Cajuputi Compositum; Linimentum Olei; Pilulæ Saponi Compositæ; Tinctura Camphoræ Composita.

OLEUM SUCCINI RECTIFICATUM. *Rectified Oil of Amber.*

Preparation.—"Take of Amber, in coarse powder, and Pure Sand, each, *one part.* Obtain by distillation, with a gradually increasing heat, an acid liquor, an oil, and an acid in crystals. Compress the crystals in bibulous paper, and sublime them a second time. The oil may be detached from the acid liquor by filtration."—*Dub.*

The above process gives the crude Oil of Amber; to purify it, the following process must be pursued: "Take of Oil of Amber *a pound;* Water *six pints.* Distill as above till two-thirds of the Water shall have passed over, then separate the oil."—*Dub.*

History.—In procuring the crude oil from amber, the heat softens and decomposes it, and its volatile oil, succinic acid and volatile spirit of amber pass over into the receiver, while a kind of bitumen or pitch remains in the retort. The oil swims upon the top of the fluid in the receiver, from which it is subsequently taken by means of a separatory instrument. This oil is of syrupy consistence, blackish, and of a characteristic empyreumatic odor. The sand prevents the amber from running together into masses, and impeding the distillation, but it renders the residuum unfit for the varnishers' use. The operation should be carried on in an iron or earthenware retort, and exposed to the direct action of the fire, for with a sand-bath the heat can not be sufficiently regulated, and a glass retort is incapable of sustaining the necessary temperature.

In rectifying the crude oil of amber, a very gentle heat suffices for its redistillation. According to the above process, the oil is obtained of a pale-yellowish color, which deepens by age, and answers every useful purpose; but by several redistillations it may be procured clear, like water, and very fluid. Its odor is characteristic, bituminous, and disagreeable, and its taste pungent and biting.

Rectified Oil of Amber is readily dissolved in absolute alcohol; alcohol of specific gravity 0.830 dissolves only about one-fifth of it. It is not soluble in water, though this fluid acquires its taste and odor in a slight degree. It dissolves caoutchouc, unites with the fixed oils, has an acid reaction, and becomes browner and more viscid by age. Its boiling-point is 186°; mixed with sixteen or twenty times its volume of sulphuric acid it separates into a lower brown-colored oil, and an upper clear oil, which last washed with water parts into a light oil above, and a milky opaque liquid. This light oil dissolves iodine, with a red color, without fulminating, is soluble in alcohol, ether, fixed and volatile oils, and does not act on potassium; the milky liquid bears some analogy to paraffine. Nitric acid forms artificial musk with it. *Eau de Luce* is formed by dissolving one part of Rectified Oil of Amber in twenty-four parts of Alcohol, sp. gr. 0.830, and ninety-six parts of Caustic Ammonia, sp. gr. 0.916. Rectified Oil of Amber is a carbo-hydrogen.

Oil of amber is sometimes adulterated with oil of turpentine. Dr. Bolley suggests the following method of detecting it: In a cylindrical glass vessel about a foot high, place the suspected oil, and pass a current of hydrochloric acid gas into it by a tube dipping to near the bottom. The gas must be dry, which may be procured by having it pass through two bottles containing coarsely-broken chloride of calcium, before entering the oil. The current is to be continued an hour, and if oil of turpentine is present to the extent of even five per cent., the mixture gives crystalline evidence of it after standing twelve hours. Of course, where the adulteration is large, the artificial camphor is apparent much sooner.—*Am. Jour. Pharm. XXVI.*, 119.

Properties and Uses.—Rectified Oil of Amber is the only form in which the oil of amber should be employed for internal use. It is stimulant, diuretic, and antispasmodic; and has been employed with benefit in amen orrhea, hysteria, dysmenorrhea, tetanus, epilepsy, pertussis, infantile convulsions, and various other spasmodic affections. The dose is from five to thirty drops on sugar, repeated as often as required. Applied externally it is a rubefacient, and has been efficaciously used as a liniment in palsy, chronic rheumatism, pertussis, and infantile convulsions; in the latter affection it should be rubbed along the spine, either alone or combined with an equal part of laudanum and three or four parts of olive oil. *Roche's Embrocation*, for pertussis and some other spasmodic affections, is composed of oil of olive, oil of cloves, each, one fluidounce; oil of amber half a fluidounce. Mix.

Off. Prep.—Linimentum Succini Compositum.

OLEUM TANACETI. *Oil of Tansy.*

History.—Oil of Tansy is prepared by distilling the Herb with Water. It is usually yellow, sometimes of a green color, darkens by age, and on standing deposits stearoptene. Its specific gravity is said to be 0.931. It has not been accurately examined.

Properties and Uses.—Oil of Tansy possesses the properties of the plant, but is seldom employed internally on account of its bitterness. It has been employed to produce abortion, but almost always with fatal results. Dose of the oil from two to five drops.

OLEUM VALERIANÆ. *Oil of Valerian.*

History.—When the root of Valeriana Officinalis is distilled with Water it yields rather more than one per cent. of a volatile oil. When freshly prepared and rectified, it is neutral, clear, with an odor not disagreeable; by exposure to the air it resinifies, becomes colored, thick, acid, owing to the formation of valerianic acid, and acquires a more disagreeable odor. The crude oil consists of at least five substances, whose relative proportions vary with the age and mode of preservation of the oil. Of these, two are volatile oils, and may be regarded as essential components of the oil. The more volatile of these is *borneen*, $C_{20} H_{16}$, a colorless fluid, identical with a carbo-hydrogen obtained from Borneo camphor, having a turpentine odor. The less volatile oil is *valerol*, $C_{12} H_{10} O_2$, which is lighter than water, has an odor of hay, absorbs oxygen by exposure, and yields valerianic acid. The three non-essential constituents are valerianic acid, a resin, and a solid volatile oil or camphor.—*P.* The specific gravity of Oil of Valerian at 77° is 0.9340, and its taste is warm and camphoric. It boils at 320°. Caustic alkalies introduced into the oil, hasten its oxidation and formation into valerianic acid, and unite with it to form valerianates.

Properties and Uses.—Oil of Valerian possesses the properties of the root in a concentrated degree, and may be substituted for it in all cases where the root is applicable. It has been found especially useful in hysteria, chorea, restlessness, etc. An efficacious preparation for nervous, sleepless, and hysterical cases is composed of:—Tincture of Lupulin, Tincture of Hyoscyamus, of each, four fluidounces; Camphor one drachm; and Oil of Valerian twenty-two minims. Mix, and give one or two fluidrachms for a dose. The dose of the Oil of Valerian is two to six drops.

PILULÆ.

Pills.

The form of pill is a very convenient mode of administering medicines which operate in a small dose, and whose nauseous or offensive odor and taste require them to be concealed from the palate. Substances which are not dissolved by water may also be given in pill form. There is, probably, no form in which medicines are more frequently administered than that of the pill; and, in many instances, to make a good pill mass requires considerable knowledge, tact, and judgment on the part of the operator. The points demanded to prepare a proper pill mass are, to obtain sufficient consistency that the particles may cohere together, and to have them firm enough to retain the globular form; their component parts should be such as to prevent any tendency to moldiness, or any absorption of moisture when exposed to the atmosphere. Medicines which are deliquescent should never enter into a pill mass, and efflorescent salts should be previously exposed to heat so as to fall to powder, by the removal of their water. Ingredients which have a chemical reaction upon each other should not be added together in a pill mass, unless it be desired to secure the influence of the resulting formation.

Gum-resins, and inspissated extracts are sometimes soft enough to be made into pills without addition; where any moisture is requisite, a few drops of alcohol is more proper than syrups or conserves, as it unites more readily with them, without sensibly increasing their bulk. In some instances where alcohol will not act upon the mass, water may be substituted.—*Coxe.*

Substances which do not admit of being made into a pill mass by themselves, must have certain inert matters added to them, called *excipients;* and such excipients only should be employed as will give the proper degree of consistence and tenacity to the mass, without interfering in any way with the action of its medicinal agents, or rendering the pills too large or hard. Excipients vary very much in their character, according to the nature of the articles to be made into pill form; the most common are syrup, mucilage, soap, bread-crumb, conserve of roses, water, spirit, gum, sugar, magnesia, starch, molasses, etc. The dry excipients are used to give the required firmness to extracts, confections, oils, and other fluid or soft substances; while the moist excipients are intended for dry medicines, or agents which are insoluble, and among these molasses, syrup, and conserve of roses are the most esteemed, especially when the pills are to be kept for a length of time.

The addition of too much gum Arabic or tragacanth to the pill mass, is objectionable, as it often causes the pill to become so hard as to have its operation materially modified, or perhaps causing it to pass through the intestines without being dissolved. Whenever the excipient is named by the physician in his prescription, the apothecary should adopt it if practicable; but, if it be not practicable, then he must follow his own judgment. Indeed, it would always be better in prescribing extemporaneous preparations of pills, if the physician would omit the excipient, and leave it to the more practical knowledge of the apothecary to supply.

The best excipients for dry powders, as jalap, rhubarb, ipecacuanha, ginger, digitalis, conium, etc., are molasses or conserve of roses; those for resinous extracts, resins, and gum-resins, are soap, proof-spirit, alkaline solutions, and sometimes mucilage; and those for the volatile oils and oleo-resins, are soap, magnesia, white wax, etc. The proper selection of these, however, depends entirely upon the peculiar nature of the medicines ordered, and requires a considerable degree of practical knowledge, not expected to be possessed by the practicing physician.

The medicinal ingredients of the pill mass should be perfectly mixed and incorporated, usually combining together the active ingredients first, and afterward the excipient; and the mass should be worked in the hand, on a pill slab, or in a mortar, until it is thoroughly homogeneous. If the mass be too hard it may not be dissolved in the juices of the stomach; if too soft, there will be difficulty in forming it into pills. The pill mass being properly formed, is now to be divided into pills; certain portions of it, are, by means of a spatula, or by the pill-machine, made into long, round, slender rolls, of the desired thickness, which are then divided into pills. If the pill-machine be used, the pills are accurately divided and made globular at the same time; if the spatula be used, the pills are rounded by the fingers. Most apothecaries are furnished with pill-machines, which serve to expedite the process, as well as to secure a greater degree of accuracy. A new pill-machine has been lately patented by a Mr. Lewis, which is said to be superior to any other yet used. "It consists of two metallic cylinders or rollers, having on their surface a series of hemispherical indentations or cups, corresponding in shape and size to half a pill, so that when the rollers are brought into contact side by side, and a rotary motion given them, the hemispheres in each fall immediately and accurately opposite each other forming a series of spherical molds, in which, during the process, the pills are cast. The arrangement for working the rollers consists of two uprights, in and between which they are fixed side by side so as to revolve on their axles. Motion is communicated by means of a handle attached to a small pinion, fitting a cog-wheel at the side of one of the rollers, at the other side of which is another cog-wheel fitting a corresponding one on the other roller; these being accurately adjusted cause each other to revolve with equal speed so as always to bring the hemispheres opposite each other. The pill mass is introduced by means of a small hopper, between the two rollers while in motion, and as from their being in close contact it can not pass through, it is pressed into the hemispheres, and the pills are thus formed, which are collected from the outer sides of the rollers as they continue to revolve. Thus far the simple plan of making or casting pills by means of a rotatory machine, with minor modifications, has been before attempted, but as frequently abandoned from the pills remaining firmly imbedded in the hemispheres of one or other of the rollers, and the want of contrivance to deliver them freely, without the necessity for detaching them with the hand. That difficulty, in the present machine, is entirely overcome, and this achievement is its principal claim to originality and practical utility. The arrangement by which this long-sought desideratum is accomplished, consists of a movable bolt or pin at the bottom of each hemisphere, which, acted upon by springs at the interior of the rollers, forces out the pills, and detaches them effectually from the mold in which they have been cast. The only point of adhesion is now the end of the pin, from which they generally fall by their own inert gravity; but to prevent the possibility of their being drawn back again into the hemispheres by the return of the pins to their original position, they are gently lifted off by being carried between the teeth of a sort of rake pressing against the outside of the rollers. Some of the pills thus formed have a slight rim round them, giving them the appearance of a seed or berry, but in every other respect they are perfect; they may, therefore, be left in their original state, or subjected to the usual process of mulling. From this machine, which had only two bands or tiers of hemispheres round the rollers, about one hundred and fifty pills might be turned out in a minute, or nine thousand in an hour, working it very slowly. There would be no difficulty in doubling the speed of working, and the rapidity of making might be multiplied by increasing the number of molds or hemispheres on the rollers." Several years ago, I saw a pattern machine upon a somewhat similar principle, but much more simple and perfect in its arrangement and action, the invention of Mr. Semple of this city, which would turn out about six hundred pills in a minute; and it is to be regretted that he has been so much occupied since, as to lay aside his valuable invention.

Several substances are used for covering pills to prevent them from adhering to each other; as powdered elm-bark, powdered orris or liquorice-roots, lycopodium, carbonate of magnesia, starch, etc.; and these powders are also used during the formation of the pill to prevent them from sticking to the fingers or to the apparatus on which they are made. The powders more ordinarily used are liquorice-root and elm; carbonate of magnesia can only be used in those instances where it occasions no decomposition with one or more of the active constituents of the pill.

In order to cover the taste and odor of pills many plans have been devised; formerly they were covered with gold or silver leaf, but this is a very objectionable method, as pills thus prepared frequently pass through the bowels without being dissolved. Another and a very excellent mode is to dip each pill in a melted solution of pure glue; but this plan is tedious and requires considerable time for the drying of the pills. Collodion has been recommended as an agent for covering pills, but as the collodion will not readily dissolve in the stomach, its employment would be improper. Sugar is frequently used, combined with gum Arabic, and sometimes starch is likewise added, the proportions of each article being the same; the pills to be dipped in a thin syrup, and then rolled in the mixture. This process is most applicable to disagreeably odorous substances, as castor, assafetida, valerian, etc., which are completely masked by it. When the gelatin is previously colored with carmine, the pills resemble hawthorn berries.

M. Calloud treats of the subject of enveloping medicinal substances in a covering to prevent unpleasant taste, in *Journal de Pharmacie*, *XXIII.*, 301. After having tried gum, starch and sugar without satisfaction, owing to the hygroscopic tendency of the sugar and gum in moist air or with a moist mass, and their tendency to crack when very dry, he had recourse to the dried mucilage of flaxseed prepared with sugar, with success. His method is,—take of flaxseed one part, white sugar three parts, spring-water a sufficient quantity. A thick mucilage is obtained by carefully boiling the seeds, the sugar is added, and the whole of the moisture evaporated by careful desiccation. This mixture is but very slightly hygroscopic, may be reduced to fine powder, and employed for covering pills. This operation is effected extemporaneously with great facility. The pills slightly moistened, are rolled in the mucilaginous powder, by which they are coated with a layer of the compound. He has used this chiefly for carbonate of iron pills, but it may be applied to other kinds.

M. Calloud suggests another process applicable in certain cases, which is the use of butter of cacao as a covering for pills, where owing to gastric irritation, the unmasked pills will cause disagreeable symptoms. The process is very simple; the prepared pills are thrown into melted butter of cacao, then removed with a perforated skimmer, and finally rolled in finely powdered sugar, or what is better, sugar of milk.

Blanchard's method consists, as improved by Baildon, of a solution of balsam tolu one drachm, in chloroform three drachms. Some of this is placed in a suitable box, the pills agitated in it, then turned upon a slab, and so arranged that they do not touch each other. In about twenty minutes they are dry and non-adhesive, and present a finished appearance. It not only conceals any unpleasant taste or smell, but it prevents the pills from becoming too hard.—*Am. Jour. Pharm.*, *XXIX.* 350.

Pills are much better preserved in small glass bottles than in the common wood or pasteboard boxes, and should always be dispensed in glass by the apothecary. As it is not always convenient to make a large amount of pill mass into pills at one time, the balance may be kept in a bladder, which should be moistened occasionally with some of the same kind of liquid the mass was made up with, or with some aromatic oil.

PILULÆ ACONITI COMPOSITÆ. *Compound Pills of Aconite.*

Preparation.—Take of Extract of Aconite *half a drachm;* Extract of Stramonium *four grains;* Valerianate of Quinia *one scruple.* Mix thoroughly together, form a pill mass, and divide into sixty pills.

Properties and Uses.—These pills are very efficacious in febrile and inflammatory complaints, where nervous irritability, restlessness, or wakefulness is present, also in nervous headache, and other nervous affections. The dose is one pill every two, three, or four hours, according to the urgency of the symptoms, and the effect caused by the use of the pills.—*J. K.*

PILULÆ ALOES COMPOSITÆ. *Compound Pills of Aloes. Anti-Dyspeptic Pills.*

Preparation.—Take of Extracts of Boneset, Mandrake, and Ginseng, each, *two drachms;* Aloes, in powder, *eight drachms;* Gamboge, Castile Soap, of each, in powder, *four drachms;* Capsicum and Lobelia Seed, of each, in powder, *one drachm;* Oil of Cloves *two minims.* Mix the Extracts together, then add the Soap, beating it up well in a mortar, and finally thoroughly beat and work in the powders, and when the whole is well incorporated, add the Oil of Cloves. Divide the mass into pills of four grains each.—*T. V. M.*

This pill is, by many, considered superior to the one originally given in Beach's American Practice, of which the following is the formula: Take of Socotrine Aloes, in powder, *four ounces;* Castile Soap, Colocynth, Gamboge, of each, *two ounces;* Extract of Gentian *four ounces;* Oil of Cloves *two drachms.* Mix as above. Dose same as above.

Properties and Uses.—This pill is cathartic in doses of from two to four pills. It has been found very useful in dyspepsia, constipation, jaundice, amenorrhea, and in all ordinary cases where cathartics are required.

PILULÆ ASSAFŒTIDÆ COMPOSITÆ. *Compound Pills of Assafetida.*

Preparation.—Take of Assafetida, Opium, Carbonate of Ammonia, each, *one drachm.* Mix the Assafetida and Opium together by means of a gentle heat, and while soft add the Ammonia. Divide the mass into seventy-five pills.

Properties and Uses.—This pill is useful in many nervous and hysterical cases. Each pill contains four-fifths of a grain of opium. The dose is one or two pills, according to the severity of the case.

PILULÆ BAPTISIÆ COMPOSITÆ. *Compound Pills of Wild Indigo.*

Preparation.—Take of Leptandrin *four grains;* Podophyllin *eight grains:* Sanguinarin *one grain:* Hydro-alcoholic Extract of Wild-Indigo Root, *a sufficient quantity* to form a pill mass. Mix thoroughly together, and divide into sixteen pills.

Properties and Uses.—These pills are cholagogue, laxative, and antiseptic; they are especially useful in typhoid fevers, and in all typhoid conditions, where it is required to keep the bowels regular. The dose is one pill, to be repeated every two, three, or four hours until a mild operation is produced; to be given daily or every other day.—*J. K.*

PILULÆ CAMBOGIÆ COMPOSITÆ. *Compound Pills of Gamboge.*

Preparation.—Take of Gamboge and Scammony, each, in powder, *twelve grains;* Elaterium *two grains;* Croton Oil *eight minims;* Extract of Hyoscyamus *a sufficient quantity.* Mix together, and divide into twelve pills.

Properties and Uses.—This is a quick and certain cathartic, useful in dropsy, obstinate constipation, etc. The dose is one pill, repeated every hour or two, till it operates. It is contra-indicated when inflammation of any of the abdominal viscera is present.

PILULÆ CAMPHORÆ COMPOSITÆ. *Compound Pills of Camphor. Cholera Pills.*

Preparation.—Take of Camphor, Opium, Kino, of each, in powder, *thirty grains;* Capsicum *five grains;* Conserve of Roses *a sufficient quantity.* Mix together and form a pill mass, and divide into thirty pills.

Properties and Uses.—These pills were much employed in Asiatic cholera, as a stimulant, antispasmodic, anodyne, and astringent, and with much success. One pill to be given after each discharge from the bowels, or oftener, if the urgency of the case require it. Where powders are preferred, the conserve of roses may be omitted, and the mixture be given in powder.

PILULÆ CIMICIFUGÆ COMPOSITÆ. *Compound Pills of Black Cohosh.*

Preparation.—Take of the Alcoholic Extract of Black Cohosh, and Scutellarin, each, *one drachm;* Valerianate of Quinia *half a drachm.* Mix thoroughly together, form into a pill mass, and divide into sixty pills.

Properties and Uses.—These pills will be found very useful in chorea, and other derangements of the nervous system, also in fevers or other diseases, attended with much restlessness or wakefulness, and in several uterine affections. The dose is one pill every one, two, or three hours, daily, according to the urgency of the symptoms.—*J. K.*

PILULÆ CATHARTICÆ COMPOSITÆ. *Compound Cathartic Pill.*

Preparation.—Take of Leptandrin, Gamboge, Scammony, each, in powder, *one drachm;* Podophyllin, Castile Soap, each, *half a drachm.* Triturate the powders thoroughly together, then add the Soap; mix and beat the whole together till they are thoroughly incorporated. Divide the mass into one hundred pills.

Properties and Uses.—This is a valuable pill in all cases where a cathartic is required, as in constipation, torpor of the biliary apparatus, hepatic disease, intermittent and remittent fevers, jaundice, etc. One pill will generally be found sufficient for a dose, rarely two pills will be required.

PILULÆ COPAIBÆ. *Pills of Copaiba.*

Preparation.—Take of Copaiba and White Wax, of each, *one drachm.* Melt the Wax, mix in the Copaiba, and divide into thirty pills.

These pills are frequently combined in other proportions, and with the addition of Cubebs. Thus: take of Copaiba *one part;* White Wax *one part and a half;* Cubebs, in powder, *two parts.* Melt the Wax, add the Copaiba and Cubebs, and divide into four-grain pills. This combination is suitable to warm climates. Another combination is: take of Copaiba *one part;* White Wax *two parts;* Cubebs, in powder, *three parts.* Prepare as above, and divide into four-grain pills.

Properties and Uses.—These pills are useful in gonorrhea, and other affections where the medicinal agents are indicated. The dose is two to four pills, three times a day.

Copaiba is usually solidified into a pill mass by the use of recently calcined magnesia. The magnesia absorbs the oil of copaiba, and at the same time forms with the acid of the copaiba a copaivate of magnesia. The time required to effect the solidification of the copaiba will be several hours, and the quantity of magnesia required will depend upon the amount of copaivic acid present. Ordinarily, sixteen parts of magnesia to one of copaiba will effect the solidification; and the mass should not be allowed to harden too much before it is divided into pills. The addition of the magnesia does not materially increase the size of the pill.

PILULÆ COPAIBÆ COMPOSITÆ. *Compound Pills of Copaiba.*

Preparation.—Take of Solidified Copaiba *one drachm;* Ethereal Extract of Cubebs *half a drachm;* Podophyllin *nine grains;* Gum Myrrh *one drachm;* Alcoholic Extract of Nux Vomica *fifteen grains.* Mix thoroughly together, and divide into three-grain pills.

Properties and Uses.—These pills are useful in gonorrhea, gleet, stricture, and chronic inflammation of the prostate. The dose is from two to four pills, twice a day. For ordinary cases, the following preparation will be found beneficial: Take of Solidified Copaiba *two drachms*; Ethereal Extract of Cubebs *one drachm;* Oil of Juniper *a sufficient quantity*, not to impair the pilular consistency of the mass. Mix, and divide into pills of four grains each. The dose is the same as above.

PILULÆ EUPURPURINI COMPOSITÆ. *Compound Pills of Eupurpurin.*

Preparation.—Take of Eupurpurin *two scruples;* Xanthoxylin *one scruple;* Strychnia *one grain.* Mix thoroughly together, and divide into twenty pills.

Properties and Uses.—This forms a stimulating diuretic, and will be found useful in suppression of urine, torpor or paralysis of the kidneys or bladder, rheumatism, hepatic torpor, derangements of the digestive functions, etc. The dose is one pill, to be repeated three or four times a day.—*J. K.*

PILULÆ FERRI CARBONATIS. *Pills of Carbonate of Iron. Vallet's Ferruginous Pills.*

Preparation.—Take of pure Protosulphate of Iron *sixteen parts;* Crystallized Carbonate of Soda *nineteen parts;* Pure Honey *nine parts;* Syrup *a sufficient quantity.* Dissolve the Protosulphate in half a gallon of Water at the temperature of 80° F., and the Carbonate of Soda in a like quantity: to each of these solutions add of Syrup *four ounces*, and then mix them in a jar, which should, afterward, be entirely filled with sweetened water, and the access of the air prevented. After the precipitate has subsided, decant the supernatant fluid, and then wash it with sweetened water, in the jar, until it is deprived of adhering sulphate of soda. After the carbonate is thus purified, throw the precipitate on a flannel cloth, express forcibly, and then mix it with the honey. This mixture should be reduced by evaporation in a water-bath, as rapidly and carefully as possible to a pilular consistence.—*Am. Jour. Pharm. X.*, 273. The object of the saccharine matter in this mixture is to prevent the oxidizing action of the air on the protoxide of iron, and by this means retaining the carbonic acid in combination with this oxide. The sulphate of iron used should be pure (*See Ferri Carbonas Saccharatum, p.* 1108). The preparation should be of a proper pill-mass consistence, dark olive color, of a sweet and strong chalybeate taste, and entirely dissolved by acid. It contains about thirty pr. ct. of protoxide of iron.

Properties and Uses.—This pill is a ferruginous tonic, and may be employed in all cases where iron is required. It is especially valuable in anemia, atonic amenorrhea, chlorosis, and hysterical affections; also in the hectic fever of phthisis and chronic mucous catarrhs. It appears to have the usual effects of iron on the blood, increasing its coloring particles and rendering it of a more scarlet color. It may be divided into three or five grain pills, of which from two to six may be given three times a day, and continued for several weeks, particularly if their use is followed by an amelioration of the symptoms of disease.

PILULÆ FERRI COMPOSITÆ. *Compound Pills of Iron. Emmenagogue Pills.*

Preparation.—Take of Subcarbonate of Iron *one drachm;* Podophyllin *fifteen grains;* White Turpentine *half a drachm.* Mix well together, and divide into thirty pills.

Properties and Uses.—This pill is used chiefly as an emmenagogue. The dose is one pill every three or four hours.

PILULÆ FERRI FERROCYANURETI COMPOSITÆ. *Compound Pills of Ferrocyanuret of Iron.*

Preparation.—Take of Ferrocyanuret of Iron, Sulphate of Quinia, and Alcoholic Extract of Black Cohosh, each, *two scruples.* Mix, and divide into forty pills.

Properties and Uses.—These pills are tonic, alterative, and antiperiodic, and may be used in all diseases attended with periodicity, as intermittent fever, chorea, epilepsy, etc. They will be found an excellent remedial agent. The dose is one pill, three or four times a day, or oftener if required.—*J. K.*

PILULÆ FERRI IODIDI. *Pills of Iodide of Iron.*

Preparation.—Agitate Iodine *one hundred and twenty-seven grains;*

coarse Iron Wire *half an ounce;* and Distilled Water *seventy-five minims,* in a strong-stoppered fluidounce vial, until the froth becomes white; then pour the fluid upon Powdered White Sugar *two drachms,* in a mortar. Triturate briskly, and add gradually Liquorice Powder *half an ounce,* Powdered Tragacanth *a drachm and a half,* and Flour *a drachm.* Divide the mass into 144 pills, each of which contains about a grain of Iodide of Iron.—*Leslie.*

Or,—Take of Sulphate of Iron *two hundred and forty-seven grains;* Iodide of Potassium *three hundred and twenty-four grains;* powdered Tragacanth *forty-six grains*; Sugar *one hundred and fifty-four grains;* Simple Syrup, Powdered Liquorice-root, each, *a sufficient quantity.* Finely pulverize the Sulphate and the Iodide, separately; mix them, and triturate in a mortar, gradually adding the Tragacanth, Sugar, and Syrup, and as much of the Liquorice-root as may be necessary to form the mass of a proper consistence. Divide into pills of two and a half grains each, and keep them in closed vials and in a dry place. Each pill contains over a grain of the Hydrated Iodide of Iron.—*Calloud.*

The salt of iron used in the latter process should be the crystallized protosulphate. By the formula given the sulphuric acid unites with the iodide of potassium, forming a sulphate of potassa, and the iodine forms an iodide with the iron. Hydriodic acid is decomposed by the oxygen of the air into water and iodine. The object of the sugar and tragacanth is to prevent the atmospheric oxygen from decomposing the pill. The pill contains sulphate of potassa, some iodide of potassium, and iodide of iron; it spoils by standing, parting with its iodine.

Properties and Uses.—This pill possesses the same medicinal properties as the solution of iodide of iron, and may be given in the same diseases. About a grain and a half of the iodide of iron enters into each pill, one of which may be given for a dose, and repeated two or three times a day.

In consequence of the intensely styptic taste of the solution of iodide of iron, as well as the disagreeable stain it imparts to the teeth and lips, a serious inconvenience has arisen in its administration, and many modes have been devised to divest it of these objections, as well as of its tendency to change. Perhaps the best mode of preparing it is the following: Take of pure Iodine, Iron reduced by Hydrogen, each, *half a drachm;* Honey *a sufficient quantity* to give the consistency of thick molasses. Triturate the Iodine as finely as possible, then add the Iron and Honey, and continue the trituration until the articles are thoroughly mixed together, and fumes of Iodine cease to be disengaged, the mixture assuming a greenish tinge. Then rub in finely powdered Extract of Liquorice *a sufficient quantity* to make the mass. After the pills have been made, for still further protection from atmospheric influence, they may be coated with a solution of balsam tolu in chloroform.

PILULÆ HYOSCYAMI COMPOSITÆ. *Compound Pills of Hyoscyamus.*

Preparation.—Take of Extract of Hyoscyamus, Extract of Valerian, each, *two drachms;* Extract of Aconite, Sulphate of Quinia, of each, *one drachm.* Mix thoroughly together, and divide into pills of three grains each.

Properties and Uses.—These pills will be found advantageous in neuralgia, rheumatism, chorea, dysmenorrhea, and many affections of a similar character. The dose is one pill every two, three, or four hours, according to circumstances. As the virtue of valerian resides in its oil, it is probable the extract is nearly useless; and one-half the quantity of the oil of valerian, or valerianic acid, should be substituted for the extract, and form a much more efficacious pill.—*J. K.*

PILULÆ LEONURI COMPOSITÆ. *Compound Pills of Motherwort.*

Preparation.—Take of the Hydro-alcoholic Extracts of Motherwort, and Unicorn-root, each, *two drachms;* Leptandrin, Cimicifugin, of each, *one drachm.* Mix thoroughly together, form a pill mass, and divide into sixty pills.

Properties and Uses.—These pills are useful in many uterine affections, acting as a uterine tonic and alterative. One pill may be given every one, two or four hours, according to the urgency of the case.—*J. K.*

PILULÆ LEPTANDRINI COMPOSITÆ. *Compound Pills of Leptandrin.*

Preparation.—Take of Leptandrin *one drachm;* Podophyllin *half a drachm;* Extract of Rhubarb *a sufficient quantity.* Mix together, and divide into sixty pills. Some prefer making these pills with Extract of Dandelion, instead of Rhubarb.

Properties and Uses.—This is a valuable cholagogue pill, very beneficial in liver affections, obstinate constipation, or wherever catharsis is required. It will likewise be found useful in dysentery. The dose is from one to three pills, once or twice a day.

PILULÆ PHYTOLACCÆ COMPOSITÆ. *Compound Pills of Poke.*

Preparation.—Take of Extract of Poke *two drachms;* Hydro-alcoholic Extract of Stillingia *one drachm;* Extract of Stramonium *eight grains.* Mix thoroughly together, form into a pill mass, and divide into sixty-four pills.

Properties and Uses.—These pills will be found of value in osteocopus, or pains in the bones of a mercurial or syphilitic character, and are also beneficial in rheumatism, syphilis, and scrofula. The dose is one pill every two, three, or four hours, as the urgency of the case may require. The Fluid Extract of Stillingia may be substituted for the Hydro-alcoholic Extract, and pulverized Poke-root added as an excipient.—*J. K.*

PILULÆ PODOPHYLLINI COMPOSITÆ. *Compound Pills of Podophyllin.*

Preparation.—Take of Podophyllin, Scammony, Gamboge, each, in powder, *one drachm;* Castile Soap *half a drachm.* Triturate the powders thoroughly together for about half an hour, then add the Soap; mix and beat the whole together till they are thoroughly incorporated. Divide the mass into one hundred and twenty pills.

Properties and Uses.—This is a most valuable pill for all diseases where cathartics are required, and has cured many cases of hepatic affections by a continued use of them. The dose is one or two pills, every night. They have no tendency toward producing constipation, but rather the reverse, and after using them for several days in succession, they will generally be found so active that it will be necessary to omit them for a number of days, before resuming their administration. They may be safely used in all ordinary cases where purgation is desired; they operate freely and thoroughly, and usually without causing nausea, griping, or debility.

In consequence of the difficulty with which pure Scammony is obtained in this country, many practitioners substitute for it, in these pills, Apocynin, or Extract of Rhubarb, or Iridin, either of which, will, probably, be found preferable to an impure or counterfeit scammony.—*J. K.*

PILULÆ POLYGONI COMPOSITÆ. *Compound Pills of Water-pepper.*

Preparation.—Take of Dried Sulphate of Iron, and Cimicifugin, each, *one drachm;* Iridin *fifteen grains;* Extract of Water-pepper *a sufficient quantity.* Mix well together, and divide into sixty pills.

Properties and Uses.—These pills are emmenagogue, and exert an especial influence on the female organs of generation. They have been used with advantage in chlorosis, amenorrhea, dysmenorrhea, uterine leucorrhea, etc. The dose is one pill every two or three hours.—*J. K.*

PILULÆ PTELEINI COMPOSITÆ. *Compound Pills of Ptelein.*

Preparation.—Take of Hydrastin, Cimicifugin, Ptelein, Aletridin, of each, *half a drachm;* Alcoholic Extract of Nux Vomica *four grains.* Mix the articles thoroughly together, and divide into sixty pills.

Properties and Uses.—These pills are very efficacious in dyspepsia, attended with distress after eating, flatulency, etc. They act upon the mucous coat of the stomach, gradually restoring it to a normal condition. I have employed them considerably, and prefer them to any other remedy which I have ever used. If constipation be present, it must be removed by rhubarb and potassa, podophyllin, or other proper agents. The dose is one pill three times a day, to be taken about an hour after each meal, with the proper attention to diet and regimen.—*J. K.*

PILULÆ QUINIÆ SULPHATIS. *Pills of Sulphate of Quinia.*

Preparation.—Take of Sulphate of Quinia *one drachm;* Aromatic Sulphuric Acid *forty-five drops.* Drop the Acid into the Quinia on a tile or slab, and triturate with a spatula until it assumes a pilular consistence; then divide into sixty pills.

History.—This method of forming Quinia into a pill mass was made known by Mr. E. Parrish. The ingredients when mixed form a fluid, which soon thickens into a paste, and finally becomes quite solid, and so adhesive as to be readily divided and rolled into pills; care must be taken not to allow the mass to become too dry and brittle before dividing it, as it is liable to do if allowed to remain too long. In this form a portion of the disulphate being converted into the soluble neutral sulphate, the preparation more nearly resembles the solutions in composition, and is believed to be more certain and rapid in its action. When it is desired to incorporate other substances in powder with the Quinia thus prepared, as prussiate of iron, etc., they should be added to the mass when it is just so soft that, upon their addition, it will immediately assume the proper consistence. It is not, however, advisable to employ this process when any considerable quantity of other ingredients are prescribed with the Quinia, unless a little syrup or honey is also added to prevent the too rapid hardening and consequent crumbling of the mass.

Properties and Uses.—For the uses of these pills, see Sulphate of Quinia. Each pill contains a grain of sulphate of quinia, and twelve are equivalent to an ounce of good Peruvian-bark. The above pill mass may be made into five-grain pills if desired, which will not be found inconveniently large.

PILULÆ QUINIÆ COMPOSITÆ. *Compound Pills of Quinia.*

Preparation.—Take of Sulphate of Quinia, Cornine, and Tartaric Acid, each, in powder, *one drachm;* Alcoholic Extract of Black Cohosh *a sufficient quantity.* Mix together, and divide into four-grain pills.

Properties and Uses.—These pills are tonic and antiperiodic, and may be employed in intermittent and remittent fevers, and in all diseases attended with symptoms of periodicity. The addition of the tartaric acid renders the quinia more readily soluble in the juices of the stomach. The dose is one pill every one, two, or three hours, according to the severity or urgency of the symptoms.—*J. K.*

PILULÆ SAPONI COMPOSITÆ. *Compound Pills of Soap. Diuretic Pills.*

Preparation.—Take of Oils of Spearmint, Juniper, and Sassafras, each, *one fluidrachm;* Castile Soap *one drachm and a half.* Beat the Soap in an iron mortar, gradually adding the Oils, and when the ingredients are thoroughly incorporated, divide into eighteen pills.—*Beach's Am. Prac.*

Properties and Uses.—These pills are stimulant and diuretic, and are very beneficial in gravel and all chronic urinary affections. The dose is three pills three times a day, or one pill every hour through the day. They were first recommended by the late Prof. T. V. Morrow.

PILULÆ TARAXACI COMPOSITÆ. *Compound Pills of Dandelion.*

Preparation.—Take of Bloodroot, in powder, *one drachm;* Podophyllin *half a scruple;* Extract of Dandelion *one drachm;* Oil of Spearmint *five minims.* Mix the Powders with the Extract, add the Oil, beat up thoroughly together, and divide into fifty pills.

Properties and Uses.—Laxative, nauseant, and diuretic. They are of much efficacy in jaundice, hepatic diseases, and affections of the kidneys. The dose is one or two pills three times a day, sufficient to produce a slight sensation of nausea. This pill is superior to the one made after the old formula.—*T. V. M.*

PILULÆ VALERIANÆ COMPOSITÆ. *Compound Pills of Valerian.*

Preparation.—Take of the Hydro-alcoholic Extract of Scullcap, and Extract of Chamomile, each, *two drachms;* Extract of Boneset, Sulphate of Quinia, of each, *one drachm;* Capsicum *one scruple;* Oil of Valerian *half a drachm*, by weight. Mix the articles together, beat them until thoroughly incorporated, and divide into ninety pills.

Properties and Uses.—These pills are tonic and nervine, and may be used in all cases where such a combination of action is desired. The dose is one pill every two or three hours.

PILULÆ VIBURNI COMPOSITÆ. *Compound Pills of High Cranberry.*

Preparation.—Take of Hydro-alcoholic Extracts of High Cranberry, Blue Cohosh, and Unicorn Root, each, *half a drachm;* Extract of Partridge-berry *one drachm.* Mix together, and divide into forty pills.

Properties and Uses.—These pills are of superior efficacy in uterine diseases, as amenorrhea, dysmenorrhea, leucorrhea, etc.; as a uterine tonic in habitual miscarriages; and may be given during pregnancy to relieve cramps and many other unpleasant sensations occurring at that period. The dose is one or two pills three times a day.—*J. K.*

POTASSA.

Preparations of Potassa.

POTASSA. POTASSÆ HYDRAS. *Caustic Potassa. Hydrate of Potassa.*

Preparation.—"Take of Solution of Potassa *one gallon.* Evaporate it over the fire in a clean iron vessel, until all ebullition ceases, and the fused Hydrate of Potassa is left, which is to be poured into proper molds."—*Lond.*

History.—The Solution of Potassa used in preparing this caustic should be one of recent manufacture, and the evaporation should be conducted in an iron vessel, as glass or earthenware are dissolved by the potassa; and in using an iron vessel, however clean it may be, a small portion of oxide of iron will be imparted to the caustic, but not in quantity sufficient to interfere with its medicinal applications. The contact of all organic substances should be carefully avoided. The evaporation must be effected as speedily as possible, so as to lessen the action of the carbonic acid of the atmosphere upon it. Absorption of carbonic acid will not take place so long as the temperature is kept at the boiling-point; but if the evaporation be in any way interrupted, and the liquid allowed to cool, the potassa becomes quickly carbonated. The molds into which the fused potassa is run should be similar to those employed for making rods of nitrate of silver—iron and cylindrical. And, as the potassa acts upon white flint glass, it should be kept in bottles of green glass having well-ground stoppers.—*C.*

Potassa, as met with in the shops, is either in the form of fragments of plates, or in cylindrical pencils of a dingy-gray color, brittle with a fibrous fracture, an intensely corrosive and alkaline taste, and an alkaline odor. Sometimes it is tinged brownish or bluish. It is exceedingly deliquescent, powerfully attracting carbonic acid from the atmosphere, and when moist feels soapy. It is very soluble in water or alcohol, its aqueous solution having the characters of liquor potassa. Acids combine with it, causing much heat, and forming crystallizable salts. It fuses at a dull-red heat, and is volatilized at a higher heat. It usually contains many impurities, as sesquioxide of iron, silica, sulphate of potassa, alumina, etc., which do not injure its value as a medicine. By dissolving it in alcohol, which does not act upon these impurities, but takes up only the pure hydrated potassa, filtering and evaporating to dryness, and then melting the dry mass, a pure Hydrate of Potassa may be procured, white, hard, brittle, and intensely caustic. This is called *Alcoholic Potassa*, and possesses the same properties as the impure alkali. Solutions of the hydrosulphurets, ferrocyanurets, and carbonates produce no precipitate with its solution. Solutions of tartaric (in excess), perchloric, and carbazotic acids occasion crystalline precipitates of the bitartrate, perchlorate, and carbazotate of potassa, respectively. A solution of bichloride of platinum throws down a yellow precipitate, which will distinguish it from soda and lithia. Lastly, it communicates a violet tinge to the flame of alcohol. Officinal potassa has the formula $KO\ HO = 56.2$; the dry potassa is $KO = 47.163$.—*P.*

Wöhler gives a very elegant method for preparing chemically-pure Caustic Potassa: Two or three parts of sheet-copper, in clippings, and one part of nitrate of potassa are placed in alternate layers in a copper crucible, which is covered and exposed to moderate redness for half an hour. The nitric acid is completely decomposed, and there remains a mixture of Caustic Potassa and oxide of copper. When cold, the mass is treated with water, the solution poured into a narrow cylindrical vessel, the mouth of which can be closed by a ground-glass plate, and, when perfectly clear, drawn off by a syphon, and evaporated if desired. Not a trace of copper is dissolved.

Properties and Uses.—Caustic Potassa is powerfully corrosive; when applied to soft animal textures, it first attracts their water, and then rapidly disorganizes them; after which extensive inflammation ensues around the part, previous to the separation of a deep slough. It has no action as a poison, except what depends directly on the local injury occasioned; no direct influence being exerted through the medium of absorption. Acids, as vinegar, lemon-juice, etc., and the fixed oils are antidotes to its injurious action, producing with it harmless salts of potassa or soapy solutions.—*C.*

It is administered internally only when in solution, as an antacid, antilithic, and diuretic. Externally it is used in its solid state for making caustic issues, opening abscesses, and destroying tumors, but from its extreme deliquescence it is very apt to spread and act on parts not desired.

To obviate this the integuments around the parts to be acted on should be protected by two or three layers of cloth, spread with adhesive plaster, and perforated with a hole in the center, of the necessary size. Then a rod of potassa, slightly moistened at the end, is to be gently rubbed over that portion of the skin embraced in the perforation of the plaster. It must be rubbed until the skin becomes discolored, when an elm or bread-and-milk poultice must be applied. In a few days the eschar will be detached. After the slough separates, the retraction of the surrounding skin always makes the surface of the issue much larger than the circle originally cauterized, the extent of which must be regulated accordingly.—*C.* In applying the caustic, wrap it with paper. We occasionally employ this caustic in the destruction of tumors, cancers, etc., and on the surface of unhealthy or malignant ulcers. A very unscientific application of a solution of this caustic, applied to the spine, has been recommended in the treatment of tetanus.

Equal parts of Caustic Potassa and Quick-lime, rubbed together and kept in well-stopped bottles, form the Vienna Caustic (*Potassa cum Calce*). It is milder than the preceding, and has been particularly recommended for cauterizing the neck of the uterus. It is also prepared in sticks. (*See Calx, Part I., p.* 170.

POTASSÆ ACETAS. *Acetate of Potassa.*

Preparation.—"Take of Carbonate of Potassa *a pound;* Acetic Acid *twenty-six fluidounces;* Distilled Water *twelve fluidounces.* Add the Carbonate of Potassa to the Acid and Water till saturation takes place, and filter. Evaporate the liquid in a sand-bath until the salt be dried, applying the heat cautiously."—*Lond.* The above measures are Imperial. According to Christison, "the chief precautions to be attended to are, that there shall be no excess of alkali, but rather the reverse, otherwise the free alkali reacts on the acid of the salt when the solution is much concentrated, and discoloration ensues; and that the drying heat shall be carefully regulated, not by the vapor-bath, the temperature of which is too low for thorough desiccation, nor by the sand-bath, which may easily raise the temperature too high—but, on the small scale, by the muriate of lime bath, and on the large scale by steam under pressure."

History.—It was formerly the method in preparing this salt to neutralize distilled vinegar with carbonate of potassa, and then evaporate; but by pursuing it, a salt of a reddish or brownish color would be obtained, arising from the organic matter contained in the vinegar, and which required some trouble and dexterity in manipulation to remove. By employing acetic acid or colorless pyroligneous acid, and a pure carbonate, a salt is obtained of sufficient purity and whiteness for medical use.

Acetate of Potassa prepared by the above process is a snow-white mass, consisting of scales having a satiny luster, of a feeble odor of acetic acid, a pungent, saline taste, neutral, and soapy to the touch. As met with in the shops it has a foliaceous appearance, not unlike spermaceti, which gave rise to its former name, *foliated earth of tartar.* It quickly absorbs moisture from the air, and is exceedingly deliquescent, being changed into an oily-like fluid, and should, therefore, be kept in closely-stopped bottles. It is very soluble in water or alcohol, the solutions having a neutral reaction. The aqueous solution soon becomes covered with mildew, and the acetate is converted into carbonate. Heat fuses it, and then decomposes it, giving off more or less decomposed acetic acid, empyreumatic oil, etc., and finally yielding a black residue, which is a mixture of carbonate of potassa and carbon, many vegetable juices contain this salt, from which is derived the carbonate of potassa found in their ashes. Its formula is $KO, C_4 H_3 O_3$, or $KO\ A=98$.

It is *incompatible* with the sulphates of soda and magnesia, tartaric acid, the stronger acids, earths and their salts, bichloride of mercury, and some other metallic salts. Impurities are rarely present; the most probable are carbonate of potassa, sulphate of potassa, chloride of potassium, alumina, lime, magnesia, iron, lead, copper, tin, which may respectively be detected by hydrochloric acid, nitrate of baryta, acetate of silver, ammonia, oxalate of ammonia, phosphate of ammonia, sulphocyanuret of potassium, sulphuric acid, sulphureted hydrogen, ferrocyanuret of potassium, and chloride of gold.—*Witt.*

Properties and Uses.—Acetate of Potassa in the dose of two or three drachms causes purging, which is occasionally attended with griping; and in dropsy, will often cause copious watery discharges by stool and urine. In doses of from ten to thirty grains it causes diuresis, to which effect is due its former name of *Sal Diureticus.* It has been used in dropsy, to render the urine alkaline in uric-acid diathesis, and in other cases where diuresis is indicated. It has likewise been found beneficial in several obstinate cutaneous affections, when given in doses to increase the urinary discharge. It increases the metamorphosis of tissues, and thereby augments the amount of both the aqueous and solid matters in the urine. It is best given in water to which a little vinegar has been added.

Off. Prep.—Tinctura Ferri Acetatis.

POTASSÆ BICARBONAS. *Bicarbonate of Potassa.*

Preparation.—Bicarbonate of Potassa may be made by saturating an aqueous solution of pure Carbonate of Potassa with Carbonic Acid Gas, then filtering, and evaporating at a heat not to exceed 155° F., setting the concentrated liquid aside that crystals may form. If the Carbonate be pure, the Water distilled, and the Carbonic Acid Gas be procured from a pure marble or calcareous spar, there will be no necessity for filtering, inasmuch as there will be no silica present to separate.

Bicarbonate of Potassa may be made by several other processes, among which may be named the following cheap and easy method: Place some purified Carbonate of Potassa in very shallow porcelain dishes, to the depth of one-third of an inch, and then add sufficient water to moisten without liquefying it. Expose these dishes, in a wine or beer cellar, close to barrels the contents of which are undergoing fermentation; every few days the mass is stirred, and in about a fortnight tested by diluting with water, filtering, and adding sulphate of magnesia to the solution. Should this cause a turbidness, the potash must again be exposed to the atmosphere of carbonic acid; but if it remains unaffected, the vessel is emptied into a tarred porcelain evaporating dish, distilled water added to double the weight of carbonate of potassa, and the dish warmed in a water-bath, which must never exceed 140° F. When the salt has entirely dissolved, it is quickly filtered, and set aside to crystallize.—*Witt.* Christison recommends a quick, certain, and economical mode of preparing it. Sesquicarbonate of ammonia, in very fine powder, is to be well mixed with carbonate of potassa, and then with the addition of a very little water, triturated briskly until a perfectly smooth, thick pulp is formed. Dry this pulp by a gentle heat, not exceeding 130° or 140°, and continue the drying until an ammoniacal odor ceases to be given off. By the drying, ammonia is evolved, and its carbonic acid combines with the carbonate of potassa, so that when the sesquicarbonate becomes wholly decomposed and all its ammonia volatilized, a pure Bicarbonate of Potassa is left behind, which may be reduced to a fine powder.

Bicarbonate of Potassa crystallizes in transparent, right-rhombic prisms, usually truncated on the acute edges; their primitive form is the rectangular octaëdre. It is odorless, of a mild, saline taste, and has a very feeble alkaline reaction. Exposed to the air, it undergoes no change. Cold water dissolves one-fourth its weight, and hot water its own weight of the salt. At a red heat it loses, without fusing, half its carbonic acid and water, simple carbonate of potassa remaining. Alcohol does not dissolve it. Protracted boiling changes its solution into the sesquicarbonate. It has no power of dissolving or disorganizing the animal textures. It is composed of two equivalents of acid 44, one of base 47.2, and one of water 9=100.2, ($2CO_2+KO+Aq.$)—*C.*

Bicarbonate of Potassa is subject to adulterations of the sulphate or muriate of potassa, from having employed an impure carbonate in its preparation; and of carbonate of potassa from some defect in the process of making it. The sulphate and muriate of potassa may be detected by chloride of barium or nitrate of silver causing a white precipitate in its solution supersaturated by nitric acid. Carbonate of potassa may be known by adding a solution of corrosive sublimate, which will cause a brownish-red precipitate, if even the hundredth part of the carbonate be present; a solution of the pure bicarbonate in forty parts of water has no effect, or at most produces merely a white haze.—*C.* According to Chevallier, when any carbonate is present in this salt, the solution, heated and then mixed with a little grape sugar (from starch) becomes changed to a brownish or yellow color.

Properties and Uses.—Bicarbonate of Potassa is antacid, antilithic, and diuretic, is less irritating and unpleasant than the carbonate, and may be used in larger doses. It is preferred as a general rule to the carbonate, for which it may in nearly all cases be used as a substitute. Dose, ten to twenty grains as an antacid and antilithic; one to two drachms, as a diuretic.

Off. Prep.—Extractum Rhei et Potassæ Fluidum; Pulvis Rhei Compositus; Syrupus Rhei et Potassæ.

POTASSÆ BICHROMAS. *Bichromate of Potassa.*

Preparation.—Take of the neutral or yellow Chromate of Potassa *any quantity;* Water *a sufficient quantity.* Dissolve the Chromate in the Water, filter, warm the filtered solution, and while warm acidulate the solution with Sulphuric Acid; then set the mixture aside for two or three days, when beautiful orange-red crystals of Bichromate of Potassa will be formed.

History.—The addition of sulphuric acid (or still better acetic acid) to the warm filtered solution, as above explained, separates half the potassa, forming a sulphate or acetate of potassa, according to the acid used; on cooling the Bichromate of Potassa is precipitated. The neutral chromate of potassa is made by heating to redness one part of native oxide of chromium and iron, commonly called *Chromate of Iron*, with one-fourth part of nitrate of potassa, when chromic acid is generated and unites with the potassa of the nitrate. By adding water the chromate of potassa is dissolved, and may be obtained from the solution by evaporation and crystallization.

Bichromate of Potassa forms in rectangular prisms, sometimes terminated by four-sided pyramids, of an intense orange-red color, permanent in the air, of a cooling, bitter, metallic taste, an acid reaction, soluble in a little more than nine and a half parts of cold water, in considerably less boiling water, and not soluble in alcohol. Its specific gravity is 1.9801. At a red heat it melts into a transparent red liquid, and crystallizes on cooling. The crystals of Bichromate of Potassa are anhydrous, and are composed of one atom of the alkali, and two atoms of acid, $KO\ 2\ Cr\ O_3 = 148$.

Properties and Uses.—Internally, this salt is a poison, though it has been used as an alterative in venereal and scrofulous affections, in doses of one-fifth or one-sixth of a grain, three or four times a day. Externally it is a caustic, and its only therapeutical use should be as an external application; it may be used in aqueous solution, from thirty to sixty grains to the ounce of fluid, or, in the state of powder. Its solution possesses very powerful antiseptic properties, and will be found advantageous in cases of gangrene, dry mortification, etc. For other uses, *see Chromic Acid*, p. 35. It is much used in calico printing, and in preparing artificial valerianic acid from fusel oil. Paper impregnated with a solution of it, and dried, forms excellent tinder. It is used in the detection of sugar in urine and other fluids. *See Saccharum*, p. 810.

Prof. Eboli, of Lima, has found many of the alkaloids to give very characteristic reactions with chromate of potassa and sulphuric acid, and which may prove very useful in chemico-legal investigations. One or two milligrammes of the alkaloid to be examined are placed on a watch-glass, then five or six drops of diluted sulphuric acid (equal weights of acid and water) are dropped on it, and a small piece of chromate of potassa put into the liquid. Each of the following changes of color occupies several hours: *Morphia*, first nickel green, then copper green, at last a dirty dark-green. *Sulphate of Morphia*, nickel green, copper green, dark yellow. *Acetate of Morphia*, nickel green, copper-green, greenish blue. *Quinia*, Scheele's green, beautifully green-yellow, dark-green. *Sulphate of Quinia*, nickel-green, copper-green, dirty yellow. *Ferrocyanuret of Quinia*, dirty green, leaf-green, dirty-yellow, chocolate color. *Cinchonia*, Scheele's green, copper green, dirty dark-yellow. *Sulphate of Cinchonia*, Scheele' green, green yellow, dirty dark-yellow. *Veratria*, dirty green, bottle green, nickel-green turbid, afterward clear, copper-green turbid, at last dirty dark-yellow. *Atropia*, after several minutes nickel green, yellow green, dirty-yellow green, and a yellowish precipitate soluble in alcohol. *Delphinia*, dirty green, clear, then turbid nickel-green, dirty yellow. *Lupulin*, greenish-yellow turbid, dirty-green yellow. *Codeia*, Scheele's green, nickel green, copper green, dirty dark-green. *Daturia*, copper green, greenish blue. *Strychnia*, intensely violet, almost black near the chromate, violet yellow, after two days blue. *Caffein* and *Naphthalin*, no reaction. *Piperin* greenish yellow, nickel green, dirty green. *Cantharidin* must be heated with concentrated sulphuric acid to near boiling, the fire removed, and the chromate added, an effervescence takes place, after which a beautiful green mass is found, which dissolves after several hours, and at last turns a dirty leaf green. N. B. A solution of the chromate must not be used, as these reactions take place so rapidly as to render it impossible to observe the changes of color.

POTASSÆ BISULPHAS. *Bisulphate of Potassa.*

Preparation.—Take of the residuum, in the preparation of pure Nitric Acid *two pounds;* commercial Sulphuric Acid *seven fluidounces and one fluidrachm;* Boiling Water *six pints.* Dissolve the Salt in the Water, add the Sulphuric Acid, concentrate the solution, and set it aside to cool and form crystals.—*Ed.* (The above measures are Imperial.)

History.—Nitrate of potash when acted upon by concentrated sulphuric acid is decomposed, its nitric acid is set free and passes over, while the potassa combines with the sulphuric acid in the retort to form Bisulphate of Potassa, which is the residuum ordered in the above formula. This residuum being dissolved in water acidulated with sulphuric acid to prevent the formation of neutral sulphate and sesquisulphate, and filtered, or decanted when clear, evaporated, and then set aside, gives crystals of the Bisulphate of Potassa. The Dublin College has given another process which also yields a pure bisulphate. It is as follows: Take of Sulphate of Potassa, in powder, *three ounces;* pure Sulphuric Acid *one fluidounce.* Place the Acid and Salt in a small porcelain capsule, and to this apply a heat capable of liquefying its contents, and which should be continued until acid vapors cease to be given off. The bisulphate, which concretes as it cools, should be reduced to a fine powder, and preserved in a well-stopped bottle.

Bisulphate of Potassa, formerly called *sal enixum*, forms a white crystalline powder, or small oblique tabular four-sided prisms; or, when obtained by extreme concentration and cooling, it forms an apparently firm, fibrous mass. It is odorless, of a very acid taste, is permanent in the air (but the concreted fibrous mass effloresces), and is soluble in two parts of cold, and half a part of boiling water. It is not dissolved by alcohol, which abstracts the second equivalent of acid, leaving the neutral salt. Exposed to a moderate heat it fuses; at a red heat it loses half its acid, and neutral sulphate of potassa remains. It is *incompatible* with soda, and ammonia, the carbonates of these bases, earths and earthy salts, most metals and their oxides, as well as some metallic salts. Its formula is $2\,SO_3+KO=127$.

Properties and Uses.—Bisulphate of Potassa is laxative and tonic, and is very useful to keep the bowels regular during recovery from acute attacks, as well as to improve the appetite. Conjoined with rhubarb it covers the bitter taste of the latter without injuring its medicinal properties. Seventy-two grains, each, of the Bisulphate of Potassa, and carbonate of soda, separately dissolved in two fluidounces of water, form, when combined, a cheap effervescing purgative. Bisulphate of Potassa may be taken in doses of from a scruple to two drachms, properly diluted.

POTASSÆ CARBONAS. *Carbonate of Potassa.*

Preparation.—"Take of Impure Carbonate of Potassa *two pounds;* Distilled Water *a pint and a half*, Imperial measure. Dissolve the salt in the Water, and filter; pour the solution into a proper vessel, and evaporate till it becomes thick; then stir it constantly with a spatula while it concretes.

"Carbonate of Potassa may be obtained more pure from crystals of Bicarbonate of Potassa heated to redness."—*Lond.*

History.—Impure Carbonate of Potassa, or Pearl-ash, is usually contaminated with sulphate of potassa, chloride of potassium, silica, and small quantities of alumina, lime, magnesia, iron, manganese, copper, chromium, soda, common salt, etc. The water dissolves, beside the carbonate, the sulphate of potassa, chloride of sodium, any alkaline phosphates present, soda, and a part of the silica; while most of the silica partly combined with potassa, together with the other impurities, remain behind. It must not pass unnoticed that small traces of lime, magnesia, iron, chromium manganese, as well as alumina and copper, if present, remain dissolved, and are partially, but not entirely separated on again evaporating to dryness. Hot water is preferable to cold, as it acts on the potassa more readily and completely. It is better to let the solution stand for several days in a cool place, when all the insoluble matter is deposited, and if the sulphate of potassa is present in any quantity a portion of it crystallizes out. The clear solution still contains most of the sulphate of potassa, and all the chloride of potassium, together with the silica, etc. To remove the greater part of the sulphate, the solution is evaporated to a pellicle, allowed to stand some days, and then strained. The solution yet contains some sulphate of potassa, chloride of potassium, and silica, which by evaporating to dryness, and dissolving in as little cold water as possible, is partially removed. The solution should be evaporated in an iron vessel, while wooden bowls, spatulas, etc., are to be avoided, as from the action of the salt on them it acquires a yellow color. The salt thus obtained is not chemically pure, but sufficiently so for most purposes.—*Witt.* The Dublin College recommend to reduce the heat when the solution is evaporated nearly to dryness, and stir constantly with an iron rod, until granular crystals are formed. The salt should be kept in well closed vials.

Carbonate of Potassa forms a snow-white odorless crystalline powder, or small roundish grains, which are opaque, of a nauseous, alkaline and caustic taste, soapy to the touch when moist, and when exposed to the air it attracts moisture, speedily deliquesces, and forms an oleaginous fluid, termed by the early chemists *oleum tartari per deliquum.* It has an alkaline reaction, is not dissolved by alcohol, but is readily soluble in water, forming a colorless solution. It is fusible at a white heat without change. It is known to be a carbonate by effervescing with strong acids, and by a solution of it causing a white precipitate (soluble in acetic acid) with lime-water, or chloride of barium. It may be known as a potassa by the tests for potassa named on page 1218. It may be distinguished from the bicarbonate of potassa by the brick red precipitate occasioned when corrosive sublimate is added to it, while the bicarbonate forms a white precipitate at first, but subsequently becoming brownish-red. If chloride of sodium be present this precipitate may be prevented.

The impurities may be detected as follows: Water, by heating the salt, when it loses in weight. If the solution be turbid, when diluted, silica is present, and caustic potassa will almost entirely dissolve it; silica may also be detected by supersaturating the solution with hydrochloric acid, evaporating, and igniting the residue; the silicic acid is insoluble in water. Chlorides may be detected by supersaturating the solution with nitric acid, when nitrate of silver will give a white precipitate; or, if a sulphate be present, chloride of barium will give a white precipitate. Carbonate of soda may be detected by exactly saturating the solution with acetic acid, then heat it to drive off carbonic acid, concentrate it if necessary, and add a solution of neutral antimoniate of potassa; if soda be present, a white granular precipitate of antimoniate of soda is formed. Cyanide of potassium may be detected by adding a somewhat oxidized solution of protosulphate of iron, and then hydrochloric acid in excess; Prussian blue is formed. Iron, carbonate of lime, alumina, etc., may be ascertained by the tests named under liquor potassa.

Properties and Uses.—All the Carbonates of Potassa are sufficiently corrosive to be energetic poisons. They occasion destruction of the mucous membranes of the fauces, œsophagus, stomach, and sometimes of the intestines—indicated at first by violent burning pain, prostration and vomiting, which is sometimes bloody, and if death does not ensue in consequence, in a few days, excessive emaciation follows, and constant irritation of the stomach and bowels. The proper antidotes to them are vinegar, lemon-juice, or fixed oil.—*C.*

Medicinally, Carbonate of Potassa is antacid, antilithic and diuretic. Useful in urinary affections, where the morbid secretion consists of lithic acid, and the lithates, for which about thirty-five grains should be given in the course of the day, in divided doses. Some prefer the potassa carbonates to the soda, for antilithic purposes, on the supposition that they are more energetic solvents. It is sometimes used in solution as an injection into the bladder for calculus. It has also been employed to remove acidity of stomach, and to increase the urinary discharge in dropsical affections. It has also been found occasionally available in jaundice. Mascagni has used it in peripneumonia, and other inflammatory diseases, with benefit, especially in those forms where there is a tendency to the deposition of false membranes. Combined with cochineal, it has considerable reputation in the treatment of pertussis. Dissolve Carbonate of Potassa, twenty grains, in a gill of water, add to it ten grains of powdered cochineal, sweeten with loaf sugar, and give an infant a teaspoonful four times a day; to a child two or three years old, two teaspoonfuls; four years and upward, a tablespoonful or more. To this preparation five to fifteen drops of tincture of belladonna is sometimes added. Externally, it has been used in the form of a solution to wounds, as a collyrium in some affections of the cornea, as an injection in gonorrhea, and as an application to some obstinate cutaneous eruptions. Dose, of the powder, in solution, from five to thirty grains. For external use, half a pound to a pound is usually employed for a bath; from six to twelve grains to the fluidounce of water, for a lotion; and from ten to sixty grains to an ounce of lard, for an ointment.

Off. Prep.—Extractum Spigeliæ et Sennæ Fluidum; Liquor Potassæ; Potassæ Acetas; Potassæ Bicarbonas; Potassæ Sulphas; Potassæ Tartras; Potassii Bromidum; Potassii Cyanuretum; Potassii Iodidum; Potassii Sulphuretum.

POTASSÆ CARBONAS PURUS. *Pure Carbonate of Potassa. Salt of Tartar.*

Preparation.—"Pure Carbonate of Potassa may be most readily obtained by heating crystallized Bicarbonate of Potassa to redness in a crucible.

It may be made more cheaply by dissolving Bitartrate of Potassa in thirty parts of Boiling Water, separating and washing the crystals which form on cooling, heating these in a loosely-covered crucible to redness so long as fumes are disengaged, breaking down the mass, and roasting it in an open crucible for two hours, with occasional stirring, lixiviating the product with distilled water, filtering the solution thus obtained, evapoorating the solution to dryness, granulating the salt toward the close by brisk agitation, and heating the granular salt nearly to redness. The product of either of the above processes must be kept in well-closed vessels."—*Ed.*

History.—Bicarbonate of Potassa is commonly a preparation free from impurities, hence, a pure carbonate may be procured from it. The heat employed drives off one equivalent of its carbonic acid together with its water of crystallization, and the pure carbonate remains. This salt was formerly called *Salt of Tartar*, being procured from bitartrate of potassa, but the greater part of the Salt of Tartar at present found in the shops is the carbonate of the preceding article prepared from the impure carbonate of potassa.

Properties and Uses.—Pure Carbonate of Potassa has the same medicinal actions as the carbonate, but being free from impurities, it is used in making the common effervescent draught, or citrate of potassa. Liquor Potassæ Carbonatis, *Solution of Carbonate of Potassa*, is made by dissolving twenty ounces of Carbonate of Potassa in Distilled Water a pint, Imp. meas., and then filtering the solution. The sp. gr. is 1.473.—*Lond.* The dose is from ten to sixty drops, in a sufficient quantity of water or mucilaginous fluid.

Pure Carbonate of Potassa may also be made as follows: Take of Bitartrate of Potassa (Cream of Tartar) *two pounds;* Nitrate of Potassa, *a pound.* Rub them separately into powder, then mix, and throw them into a brass vessel, heated nearly to redness, that they may undergo combustion. From the residue prepare the purest carbonate of potassa in the manner directed for the carbonate. This mode is recommended by Wicke, and Engelhardt, as unobjectionable, and not occasioning the production of cyanuret of potassium as was formerly supposed. See M. Bloch's method, *Am. Jour. Pharm.*, *XXVII.*, 266.

POTASSÆ CHLORAS. *Chlorate of Potassa.*

Preparation.—Make an aqueous solution of Caustic Potassa *one equivalent*, with Water *a sufficient quantity* to contain ten and a quarter per cent. of the Potassa; making the solution of specific gravity 1.110. Mix this with Hydrate of Lime (Quick-lime) *five and a half equivalents.* Apply heat, and slowly raise it to 122° F., and then saturate the solution with chlorine gas passed rapidly into it, and which will cause an elevation of the heat to nearly 194° F. Evaporate till the solution is nearly dry, dissolve the product in water at 212° F., filter, and allow the solution to crystallize.—*F. C. Calvert.*

History.—By the former processes between forty-two and forty-four parts of chlorate were obtained from one hundred parts of caustic potassa; Prof. Calvert's method furnishes from 258 to 260 parts, provided the specific gravity of the solution be as above named. When chlorine gas comes in contact with a solution of caustic potassa, or carbonate of potassa, chloride of potassium, hypochlorite of potassa, and bicarbonate of potassa are formed; as the chlorine increases the bicarbonate is decomposed, carbonic acid is evolved, and more of the first two named salts is produced. By continuing the chlorine gas, more hypochlorite is produced, the chlorine abstracts the potassium from the potassa, forming chloride of potassium, while the oxygen thus set free combines with some hypochlorite of potassa, and converts it into the chlorate, the greater part of which crystallizes. The residual liquid contains a little chlorate, some free hypochlorous acid, and a considerable quantity of hypochlorite of potassa, and chloride of potassium.—*P.* In Calvert's process the oxygen contained in the lime reacting on the chlorine (after a certain portion of it has formed with the lime, chloride of calcium), changes it into chloric acid. This acid unites with the potassa, forming the large amount of chlorate procured in this manner.

Pure Chlorate of Potassa forms white, permanent, transparent, mother-of-pearl-like, oblique, four or six sided rhombic plates, which are odorless, and have a cooling, saline taste, like that of nitre. They are luminous when rubbed in the dark. Heat fuses them, oxygen is evolved, and chloride of potassium remains. Triturated with combustible substances, as carbon and sulphur, Chlorate of Potassa detonates, being highly dangerous, even in small quantities. It dissolves in sixteen parts of water at ordinary temperature; in two parts at 212° F.; alcohol of 80 per cent. dissolves only the one hundred and twentieth part of it at 60° F., but much more when boiling. Sulphuric acid gives it an orange-red color, and evolves chlorous acid, which is yellow and powerfully explosive when heated. Its solution is neutral.

When Chlorate of Potassa is contaminated with chloride of potassium, nitrate of silver causes a white precipitate of chloride of silver; if chloride of calcium be present, the chlorate attracts moisture from the air, and gives a white precipitate with oxalate of ammonia. A yellow color indicates iron, which is proved by ferrocyanuret of potassium. The admixture of nitrate of potassa with it is known on heating a portion for some time to redness, by its solution imparting a brown color to turmeric paper. In reducing Chlorate of Potassa to powder by trituration, a little water should be added, enough to cover the salt, in order to prevent an explosion; filter, and dry the powder. Its formula is KO, ClO_5; its equivalent weight 122.5.

Properties and Uses.—This salt seems to hold a position between hydrochlorate of ammonia and nitrate of potassa, and has been used in malignant febrile diseases, and in cholera. It is diuretic, and is recognized in the urine of those to whom it has been exhibited. It has been efficaciously employed in scorbutus, hepatic affections, in aphthous ulcerations of the mouth, cancrum oris, mercurial salivation, abscesses, boils, eruptions, ulcers, purpura hemorrhagica, etc. About twenty-five grains are soluble in a fluidounce of water, and it may be given in doses of from half a drachm to two drachms daily, or from two tablespoonfuls of the solution to eight or ten; in very large doses it purges. Five grains well diluted is a fair ordinary dose for a child one year old. Large doses should be given at meal-time, and in a large quantity of broth or other fluid. M. Isambert considers it a sedative to the nervous system, and to the circulation; a stimulant to the digestive organs and kidneys; and a stimulant and alterative to mucous tissues. If this last be the case it must prove useful in leucorrhea, excoriations of the os uteri, chronic dysentery, nursing sore-mouth, some forms of chronic ophthalmia, and gleet. Applied in the form of powder with starch, or oxide of bismuth, it causes pain. In gangrene and ulceration of the mouth this salt removes the offensive odor, lessens the discharge of saliva, and favors granulation. Externally it may be applied as a wash or injection in solution; from six to fifteen grains being dissolved in a fluidounce of water. It answers thus, in affections of the mouth, aided by its internal administration. It has been given in doses of 160 grains daily, producing hot skin, headache, quick, hard, and full pulse, white tongue, and increase of urine.

POTASSÆ SESQUICARBONAS. *Sesquicarbonate of Potassa. Vegetable Caustic.*

Preparation.—Take of Bicarbonate of Potassa *one pound;* Water *a sufficient quantity.* Dissolve the Bicarbonate in the Water, strain, and then evaporate by means of heat raised to a very few degrees above the boiling point; when sufficiently concentrated set aside to cool. Dry the resulting sesquicarbonate by a gentle heat.

History.—This is the method at present pursued in the preparation of the Vegetable Caustic. The bicarbonate of potassa becomes partially decomposed during the evaporating process, but whether it is converted into a true sesquicarbonate of potassa ($2\,KO\ 3\,CO_2$), or is deprived of half its carbonic acid, remains yet to be determined.

Sesquicarbonate of Potassa, as prepared by the above process, is sold in the form of a white powder, having a pungent but not very powerful alkaline odor, a sharp, strongly alkaline taste, is permanent in dry air, very soluble in water, but insoluble in alcohol. It is *incompatible* with the same substances as the carbonate of potassa.

The above preparation differs very materially from the original *Vegetable Caustic*, in "Beach's American Practice," which was prepared by making a strong ley of hickory or oak-wood ashes, and evaporating it in an iron kettle to dryness. This formed an impure caustic potassa, of a dingy-gray or greenish color, very caustic, but less so than the hydrate of potassa, very deliquescent, and soluble in water. It is more severe in its action than the sesquicarbonate, and has occasionally to be employed in cases where that exerts but little or no beneficial influence. As it rapidly attracts moisture from the atmosphere, it must, as soon as prepared, be placed in green glass bottles with good corks or stoppers.

Properties and Uses.—Each of these preparations is escharotic, but does not, like the hydrate of potassa, destroy or decompose the healthy tissues; their action appears to be altogether exerted upon abnormal growths and conditions of parts. They are employed as local applications to fistulas, cancers, fungous growths, indolent ulcers, unhealthy conditions of mucous tissues, as in ophthalmic affections, diseases of the Schneiderian membrane, of the mouth and throat, urethra, vaginal walls, and cervix uteri. In solution, it has been injected into the uterus in dysmenorrhea, uterine leucorrhea, etc., without any unpleasant symptoms arising. In these latter cases the milder sesquicarbonate must be used, commencing with a weak solution, and gradually increasing in strength, until the maximum degree that can be used is obtained. Upon healthy tissues these agents exert but very feeble action; and in unhealthy conditions they bring about a normal action without exciting an undue degree of inflammation. They are agents of great value.

POTASSÆ SULPHAS. *Sulphate of Potassa.*

Preparation.—Take of the residuum of the preparation of Nitric Acid *two pounds;* Boiling Water *two gallons.* Expel the excess of acid by heating the salt in a crucible; boil what remains in the Water until a pellicle forms; filter the solution; set it aside for crystallization. Pour off the liquor from the crystals, and dry them.—*Lond.*

History.—As before observed, under Bisulphate of Potassa, the residuum of the preparation of nitric acid is composed of bisulphate of potassa, with probably some impurities. The heat drives off the excess of acid, and when the salt is dissolved its impurities are removed by filtration, and it is procured by evaporation and crystallization.

Sulphate of Potassa may also be procured by other processes, as by the decomposition which ensues when carbonate of potassa and sulphate of magnesia react upon each other during the preparation of carbonate of magnesia, etc. The excess of acid in the salt remaining after the distillation of nitric acid, may also be neutralized by slaked lime, or white marble, instead of the heat as directed in the above formula; sulphate of lime is deposited, while the solution contains sulphate of potassa, which may be procured by filtering, evaporating and crystallizing. This salt also occurs in volcanic regions and in the juices of plants; also in the blood and urine of man; but the medicinal article is always an artificial preparation. It has at different times been known under the names of *Sulphate of Kali*, *Vitriolated Tartar*, *Sal-Polychrest*, *Sal de Duobus*, etc.

Neutral Sulphate of Potassa crystallizes in permanent, right-rhombic, four or six sided prisms or pyramids; they are transparent, colorless, very hard, odorless, with a slightly bitter and somewhat pungent taste. Cold water dissolves one-sixteenth, and boiling water rather more than one-fifth its weight of the salt; the solution has a neutral reaction. It is not dissolved by alcohol. When heated the salt decrepitates; a strong red heat fuses it, but without change; heated with carbonaceous matter the sulphate is deoxidized, and sulphuret of potassium is formed. A solution of Sulphate of Potassa slightly acidulated with nitric acid, yields a white precipitate with chloride of barium, and a yellow one with chloride of platinum. It is seldom adulterated, though it may contain impurities from carelessness of preparation. *Lime* may be detected by the solution forming a white precipitate with oxalate of ammonia: *alumina*, by the white flocculent precipitate with ammonia, insoluble in excess, but soluble in caustic potassa; if soluble in caustic ammonia it is oxide of *zinc*, while if unaffected by either potassa or ammonia, but dissolved by chloride of ammonium, it is *magnesia*. Should ammonia cause a blue color in a solution of sulphate of potassa, *copper* is present, and the solution, after the addition of a few drops of hydrochloric acid, will give a blackish-brown precipitate with sulphureted hydrogen. If ammonia causes a yellowish or brownish precipitate, it denotes *iron*. Nitrate of silver will form a white precipitate if *hydrochloric acid* be in the solution. If *arsenic* be present, sulphureted hydrogen will cause a precipitate of sulphuret of arsenic, which, being mixed with neutral oxalate of potassa, and heated in a narrow test-tube, forms a metallic deposit of arsenic.—*Witt.* Sulphate of Potassa has the formula $KO\ SO_3$, and the equivalent weight 87.

Properties and Uses.—Sulphate of Potassa is a mild, unirritating cathartic, in doses of from fifteen to thirty grains, when sufficiently diluted with water. In one or two ounce doses, it acts as a powerful irritant, and has given rise to fatal accidents. It has been used as an aperient after delivery, in puerperal fever, to remove intestinal accumulations in children, in dyspepsia, and in jaundice. Combined with five or ten grains of rhubarb it is useful in hepatic disorders and hemorrhoids.

POTASSÆ SULPHAS CUM SULPHURE. *Sulphate of Potassa with Sulphur.*

Preparation.—Take of Nitrate of Potassa, in powder, and of Sublimed Sulphur, *equal weights*. Mix them well together, and throw the mixture, by small portions at a time, into a red hot crucible. When the deflagration is over, allow the salt to cool, and place it in a glass vessel well stopped.—*Ed.*

History.—When a mixture of sulphur and nitre is thrown in small quantities at a time into a heated crucible, the sulphur burns with a blue flame, and becomes oxidized at the expense of the oxygen of the nitric acid, and the resulting grayish-white compound consists principally of sulphate of potassa, mixed probably with some sulphite, but its precise nature has not yet been ascertained. It is much more soluble than the sulphate of potassa; and it crystallizes from a state of solution in rhombic prisms, the primitive form of that salt. Both the substance itself and its yellowish solution have a sulphurous odor, and an acid reaction. Sulphureted hydrogen is not obtained on the addition of an acid to it, nor is sulphuret of lead thrown down by the salts of that metal. The salts of baryta cause a white precipitate insoluble in nitric acid, so that sulphate of potassa is present. Eight parts of cold water dissolve one of this compound. It was formerly called *Sal Polychrestum Glaseri*, *Glaser's Sal Polychrest.—C.—P.*

Properties and Uses.—This preparation is considered a mild cathartic, resembling very much in its action, that of the sulphate of potassa. It was formerly much in vogue as a purgative in dyspepsia, chronic cutaneous eruptions, etc. The dose is from half a drachm to a drachm, and generally given with some other gentle laxative, as bitartrate of potassa.

POTASSÆ TARTRAS. *Tartrate of Potassa. Soluble Tartar.*

Preparation.—"Take of Bitartrate of Potassa *three pounds;* Carbonate of Potassa *sixteen ounces*, or *a sufficiency;* Boiling Water *six pints*, Imp. meas. Dissolve the Carbonate in the Water, add the Bitartrate till the liquor is neutralized, boil and filter. Concentrate the liquor till a pellicle forms on its surface, and then set it aside to cool and crystallize. The residual liquor will yield more crystals by further concentration and cooling."—*Ed.*

History.—Tartrate of Potassa, also known by the names of *Soluble Tartar*, *Sal Vegetabile*, and *Tartarized Kali*, was known as early as the seventeenth century. 2352 parts of cream of tartar require 865 parts of carbonate of potassa, but as the cream of tartar of commerce always contains some tartrate of lime, the proportion of cream of tartar must either be increased, or the carbonate of potassa diminished, in order to obtain a neutral salt. The cream of tartar must be added in small portions on account of the effervescence caused by the evolution of the carbonic acid; at first but little carbonic acid is given off, that liberated from one portion of carbonate combining with another to form bicarbonate, which in its turn becomes decomposed. The tartrate of lime in the cream of tartar partially separates during the saturation, but a considerable portion will be held in solution by the neutral salt, and may be nearly got rid of by diluting considerably with water after the saturation, and exposing the solution for several days to the cold. In order to obtain it chemically pure, the cream of tartar purified by hydrochloric acid must be used. The continued stirring during the neutralization is partly to assist the evolution of the carbonic acid, and also to prevent the lime, when precipitated, from adhering to the bottom of the pan.—*Witt.* The carbonate of soda is first made into a solution; being more readily soluble than the cream of tartar. The filtration separates any foreign substances, as tartrate of lime; and the solution when concentrated by evaporation should be removed to a warm iron vessel, lined with porcelain, for gradual crystallization. If iron vessels be used, the metal will be acted upon and impart a dark color to the salt.

Neutral Tartrate of Potassa forms fine white, transparent crystals which are right-rhombic prisms, or derived six-sided prisms, terminated by two converging planes. It is neutral, odorless, of a slightly bitter, saline taste, gradually absorbs moisture from the air, without any great deliquescence, is soluble in its own weight of cool water, in half its weight of boiling, and is very slightly soluble in alcohol. Its aqueous solution decomposes by keeping. Heated, it fuses, becomes black, evolves the odor of caramel, gives off acid vapors, and yields a residue of carbonate of potassa and charcoal. The crystals only should be used in medicine. It seldom contains impurities, except accidental. If it does not give a perfectly clear solution with water, tartrate of lime is to be suspected; the filtered liquid which will still retain a portion of the lime, gives in this case a precipitate with oxalate of ammonia; if when filtered from this, a fresh precipitate is caused by phosphate of ammonia, magnesia is present. If the residue after dissolving the salt in water, is not entirely soluble in hydrochloric acid, silica is probably present. Iron, if present, will color the solution red, when sulphocyanuret of potassium is added. Copper gives a reddish-brown color with ferrocyanuret of potassium; alumina may be detected by carbonizing the tartar, boiling it with excess of diluted sulphuric acid, filtering, and then supersaturating with ammonia, when a white flocculent precipitate occurs, which being washed, dried, and heated with solution of cobalt on charcoal, acquires a blue color. Sulphuric acid, if present, forms with nitrate of baryta, a precipitate insoluble in dilute nitric acid; hydrochloric acid forms a precipitate with nitrate of silver, also insoluble in dilute nitric acid. These tests may also be used in the same manner to detect the impurities in bitartrate of potassa. The formula of Tartrate of Potassa is $2\,KO\,C_8\,H_4\,O_{10}$ or $2\,KO\,\bar{T}$; its equivalent 225.—*Witt.* It is *incompatible* with acids, acid fruits, lime, baryta, strontia, magnesia and its sulphate, muriate of ammonia, sulphates of soda, potassa, etc.—*Coxe.*

Properties and Uses.—This salt is a gentle purgative and diuretic, communicating alkaline properties to the urine. It has been employed in dyspepsia, diarrhea, liver-complaint, in uric acid deposits, and sometimes as an adjunct to other more active purgatives, as infusion of senna. It may be given in doses varying from a drachm or two to half an ounce, or even an ounce, in sufficient water.

POTASSII BROMIDUM. *Bromide of Potassium.*

Preparation.—"Take of Bromine *two ounces;* Carbonate of Potassa *two ounces and one drachm;* Iron Filings *an ounce;* Distilled Water *three pints*, Imp. meas. First add the Iron, and afterward the Bromine to a pint and a half of the Distilled Water, and stir frequently for half an hour, with a spatula. Apply a gentle heat, and when a greenish color occurs, gradually pour in the Carbonate of Potassa, dissolved in the rest of the Distilled Water. Filter, and wash the residue with two pints of boiling distilled water, and filter again; mix the liquors which have been procured by filtration, and concentrate that crystals may form.—*Lond.*

History.—By the above operation, bromide of iron is produced in solution ($Br + Fe = Fe\ Br$); this is afterward decomposed by carbonate of potassa, by which proto-carbonate of iron and Bromide of Potassium are formed. Upon filtering, the Bromide of Potassium in the solution is separated from the insoluble protocarbonate, and by concentration and crystallization is procured in crystals.

Bromide of Potassium crystallizes in white cubes and octohedra, of a pearly luster; it is permanent in the air, odorless, and of a sharp saline afterward cooling taste, resembling ordinary salt. On heating it decrepitates like salt, and fuses to a clear liquid without decomposition; in a strong red heat, it volatilizes, although but slowly. It dissolves in four parts of cold, and in its own weight of boiling water; is soluble in two hundred parts of cold alcohol of eighty per cent., and in sixteen parts of boiling; the solutions have a neutral reaction.—*Witt.* Acetate of lead, and the salts of protoxide of mercury, also occasion a white precipitate. The commercial article frequently contains iodide of potassium; to recognize the iodide place some crystals of the suspected bromide on a plate with some solution of starch, and carefully add a minute portion of diluted nitric acid; the blue iodide of starch is produced. Lassaigne used chlorine instead of nitric acid. He states that though bromide of iodine does not act on starch paper, yet that if the paper be exposed to the air, the wetted part becomes successively red, violet, and blue; the organic matter of the paper probably decomposing the bromide of iodine and enabling the iodine to act on the starch. The alkaline reaction of Bromide of Potassium is due to adhering carbonate of potassa, caused either by the use of caustic potassa solution not free from the latter, or an excess of the potassa solution; under these circumstances the salt becomes moist in the air, and effervesces with the acid. On the addition of hydrochloric acid the salt should not become colored, although chloride of potassium and hydrobromic acid are formed; if, however, it instantly acquires a reddish color, *bromate of potassa* is present. The bromic and hydrobromic acids which are liberated at the same time, become mutually decomposed, forming water and bromine, which latter remains dissolved and occasions the color. *Sulphuric acid* is known by the white precipitate it causes with chloride of barium. Bromide of Potassium has the formula $K\ Br$, and the equivalent weight 119.—*P.*—*C.*

Properties and Uses.—The effects of Bromide of Potassium on the system appear to be similar to those of iodide of potassium. When given in small doses and continued daily for several months it does not exert any injurious effect, and may be detected in the urine by the application of starch, and a few drops of chlorine, which imparts a yellow color. If the alimentary canal is in an irritable condition its use is apt to produce diarrhea. It generally produces diuresis. It has been successfully used in enlarged spleen, and liver, swellings of the lymphatic glands, scrofula, hypertrophy of the ventricles, and constitutional syphilis. The dose is from three to ten grains, three times a day, in pill or solution. One or two scruples of the salt mixed with an ounce of lard, forms an ointment useful in bronchocele, enlarged spleen, and scrofulous tumors; and this should be conjoined with the internal use of iodine, or the bromide.—*P.*—*C.*

POTASSII CYANURETUM. *Cyanuret of Potassium.*

Preparation.—"*Eight ounces* of Ferrocyanuret of Potassium (Yellow Prussiate of Potash) are finely powdered, thoroughly dried with a gentle heat, intimately mixed with *three ounces* of pure Carbonate of Potassa. The mixture is thrown by spoonfuls into a red-hot Hessian or iron crucible, allowed to remain in the fire until thoroughly fluid, and a glass rod or iron spatula dipped into it and withdrawn becomes covered with a clear liquid, which on cooling solidifies to a white (not at all yellow) mass. When this point is attained, the crucible is removed from the fire, over which it is held for a few minutes to allow the black particles swimming in it to subside the more readily; the clear liquor is then poured on a clean iron dish, broken into pieces so soon as it has solidified, and kept in well closed vessels. The yield will be from six to six and three-quarter ounces."

History.—Ferrocyanuret of potassium, deprived of its water of crystallization, consists of $2\,K\,Cy + Fe\,Cy$. By fusing this with ane quivalent of carbonate of potassa, the oxygen of half the potassa combines with half the cyanogen of the cyanuret of iron to form cyanic acid, which with the other half of the potassa forms cyanate of potassa $= KO + Cy\,O$; the potassium liberated, with the other half of the cyanogen of the cyanuret of iron, forms Cyanuret of Potassium; the iron separates in a metallic state, as grayish-black flakes, and the carbonic acid is evolved. As the cyanuret is apt to become oxidized by the absorption of oxygen, a loose cover might be laid upon the crucible. The mixture must be added to the crucible by small quantities at a time, to allow of its being covered by the fused portion, as all which adheres to the sides of the crucible above this does not form a pure product. It is necessary to take care that no particles of iron remain floating in the mass previous to pouring it out. If the carbonate of potassa, or ferrocyanuret of potassium used, is not thoroughly dry, ammonia is formed, and may be detected by its odor.—*Witt.* Several other processes are pursued for the preparation of this salt.

Cyanuret of Potassium forms solid white lumps of a crystalline fracture, odorless, but possessing a strong, alkaline taste, with a flavor resembling that of peach-kernels; it changes reddened litmus-paper to its original blue. In the air it deliquesces, evolving hydrocyanic acid and carbonate of ammonia, while carbonate of potassa forms the residue. The acid is from the cyanuret, and the ammonia from the decomposition of the cyanate of potassa. It is dissolved by water, and by boiling alcohol from which it precipitates almost entirely on cooling. Heated, it fuses unchanged if kept from the action of the air, otherwise it attracts oxygen and is converted into cyanate of potassa. It is readily acted upon by acids, undergoing decomposition, and evolving hydrocyanic acid. It is very subject to decomposition, which, however, occurs gradually; and as its purity and quantity of acid is apt to vary, great care is required in its administration. For a method of estimating the purity of Cyanuret of Potassium, see *Am. Jour. Pharm.*, *XXVIII.*, 555. The formula of this salt, when pure, is K Cy; its equivalent 65.2. The pure salt is obtained in the form of a snow-white crystalline powder, and can only be made by direct combinations of pure hydrocyanic acid, and pure potassa. The formula of the salt as made by the above process is, according to Wittstein, $7 \text{ K Cy} + 3 (\text{KO} + \text{Cy O})$.

Properties and Uses.—This salt ranks in activity as a poison, next to hydrocyanic acid. Medicinally, it has been preferred to hydrocyanic acid, on account of its not so readily becoming decomposed, and being more constant in its strength. It is used in all instances where hydrocyanic acid is indicated, in the dose of about one-eighth of a grain, and should be given in a tablespoonful of pure water, or diluted aromatic syrup. Great care must be employed in using it. A very excellent cough preparation is made of Solution of Conium three fluidounces, Tincture of Cyanuret of Potassium six fluidrachms, Tincture of Opium four fluidrachms; mix. The dose is a teaspoonful four times a day. The Solution of Conium is made by rubbing Inspissated Juice of Conium five drachms with six ounces of Tincture of Tolu, half a pint of Madeira Wine, and half a pint of pure water. The Tincture of Cyanuret of Potassium by dissolving four or five grains of the salt in six fluidrachms of alcohol. Externally, it has been efficaciously used in neuralgia, sciatica, rheumatism, etc., being applied to the part on lint or linen, in the proportion of eight grains of the cyanuret to two fluidounces of distilled water; keeping the part constantly moistened with it. The dark spots produced by nitrate of silver on the conjunctiva, are obliterated by dropping the solution of the cyanuret into the eye on each alternate day.—*Guthrie.*

POTASSII IODIDUM. *Iodide of Potassium.*

Preparation.—"Take of Iodine (dry) *five ounces;* Fine Iron Wire *three ounces*; Water *four pints*, Imp. measure; Dry Carbonate of Potassa *two ounces and six drachms.* With the Water, Iodine, and Iron Wire prepare solution of Iodide of iron as directed for *Ferri Iodidum.* Add immediately, while it is hot, the Carbonate of Potassa previously dissolved in a few ounces of water, stir carefully, filter the product and wash the powder on the filter with a little water. Concentrate the liquor at a temperature short of ebullition till a dry salt be obtained; which is to be purified from a little red oxide of iron and other impurities by dissolving it in less than its own weight of boiling water, or still better, by boiling it in twice its weight of rectified spirit, filtering the solution, and setting it aside to crystallize. More crystals will be obtained by concentrating and cooling the residual liquor."—*Ed.*

Wittstein prefers the following process to any other: "To freshly prepared solution of caustic potassa, sp. gr. 1.333, in a cylindrical glass vessel, dry iodine is added, with constant stirring, and without the application of heat, until the solution acquires a brownish-yellow color, and retains it when allowed to stand some hours. To *four parts* of caustic potassa of the above sp. gr., *three parts* of iodine will be requisite. The solution and any precipitate that may have formed, are now poured into a porcelain dish, evaporated to dryness, finely powdered, then intimately mixed with one-twelfth its weight of finely powdered wood charcoal, and the mixture thrown by spoonfuls into a red-hot iron crucible; the heat is continued for a quarter of an hour, and the crucible emptied into some iron vessel. The cooled mass and the portions adhering to the crucible are treated with their weight of water in a porcelain dish, and the solution aided by heat; the liquid is then filtered and evaporated slowly to crystallization, which is repeated with the mother-liquors, until they are reduced to a small quantity. The crystals are drained from the mother-liquor in a funnel, thoroughly dried on a flat dish, and kept in a well-closed bottle. Three parts of iodine yield nearly four parts of the iodide. The last of the mother-liquor generally reacting strongly alkaline, is treated, if of sufficient quantity, with alcohol of 80 per ct., which leaves the carbonate of potassa."

History.—3540 parts of potassa, or 13,615 of liquor potassa, sp. gr. 1.333 require 9516 parts of iodine; or four parts of solution require nearly three parts of iodine, and as a slight excess of the latter is requisite, three parts are necessary. The potassa must be freshly prepared and pure. Six equivalents of iodine acting upon six of potassa, gives rise to the formation of one equivalent of iodate of potassa ($KO+IO_5$) and five equivalents of Iodide of Potassium ($5\ KI$). In order to facilitate the decomposition of the iodate into Iodide of Potassium, the mixture, toward the latter part of the first evaporation is mixed with charcoal, and subsequently submitted to a low red heat. Solution and filtration then separates the Iodide of Potassium from the other matters, and it may be obtained by concentration and crystallization.—*Witt.* There are several other methods by which this salt is prepared.

Iodide of Potassium crystallizes in semi-opaque cubes, or octohedrons; belonging to the regular system. It is odorless, and of a pungent saline afterward slightly bitter taste. In a dry atmosphere it remains unchanged; but in damp air the crystals gradually become yellow and moist, from the carbonic acid and water in the air acting on them, causing the formation of carbonate of potassa and hydriodic acid, the latter of which is again decomposed by the oxygen of the air into water and iodine. If a slight excess of iodine be present, the salt has a pale yellowish tint. If it contain a small portion of carbonate of potassa, it gradually attracts moisture from the air, becoming entirely liquid. At a red heat the salt fuses without decomposing, although slight traces of it volatilize. It requires three-fourths its weight of cold, and one-half of hot water for its solution. Alcohol of 80 per ct. dissolves in the cold one-seventh, when heated one-fifth its weight; the solutions must not render turmeric paper brown.—*Witt.* Its aqueous solution dissolves iodine, forming a dark reddish-brown fluid. A solution of bichloride of mercury added to a solution of pure Iodide of Potassium, causes a vermillion red precipitate of biniodide of mercury, soluble in excess of Iodide of Potassium; but it causes no precipitate with the *bromide of potassium.* Acetate of lead produces a yellow precipitate of iodide of lead. Calomel or protonitrate of mercury causes a grayish or greenish-yellow precipitate of protiodide of mercury. Bichloride of platinum produces a brownish-red biniodide of platinum. Nitrate of silver precipitates a pale-yellow iodide of silver. Sulphuric acid added to Iodide of Potassium, and heat applied, violet-colored vapors are evolved. An infusion of starch has no effect on a solution of pure Iodide of Potassium, but if a few drops of nitric acid, or a mixture of chlorine and nitric acid be added, blue iodide of starch is formed, which is decolorized by caustic alkali, or by boiling.—*P.*

Iodide of Potassium is often rendered impure by the presence of several foreign substances. *Carbonate of potassa* may be detected by lime-water rendering the solution milky; by its destroying the color of tincture of iodine, which is not affected by the pure salt; and by alcohol, which does not dissolve the carbonate, but does the pure iodide. *Sulphate of Potassa* is known by giving a white precipitate with chloride of barium, insoluble in nitric acid. *Iodate of Potassa* is insoluble in alcohol: if tartaric acid be added to the solution of iodide, crystals of tartaric acid are deposited, and if the iodide be pure, the liquid becomes quickly yellow by the oxygen of the atmosphere acting on the hydriodic acid which is thus generated; but if iodate of potassa be also present, hydriodic and iodic acids are disengaged, and a quantity of free iodine is at once developed. Iodate of potassa may also be known by hydrochloric acid causing a brown color instantly. *Chloride of Sodium* or *potassium* gives a white precipitate with nitrate of silver, which is readily soluble in caustic ammonia. Iodide of Potassium was formerly termed *Hydriodate of Potash;* the crystals contain no water of crystallization. Its formula is KI, and its equivalent weight 165.—*P.*—*Witt.* Mr. W. Copney proposes as a test for the presence of carbonate and iodate of potash, recently and carefully prepared syrup of protiodide of iron; upon adding a drop of this to a sample of the suspected iodide dissolved in distilled water, a pale-blue precipitate is caused if carbonate of potassa be present and a red one if iodate be the impurity.

Properties and Uses.—In very large doses Iodide of Potassium is an irritant, though Dr. Elliotson states that six drachms may be given daily and continued for many weeks, without inconvenience. In small doses it is diuretic and alterative; iodine has been detected in the urine a few minutes after the exhibition of the iodide. A drachm of the iodide taken in divided doses has caused vomiting, colicky pains, slight diarrhea, frequency of pulse, and slight exhaustion; and Dr. Laurie has known small doses to produce serious and even fatal results in certain constitutions. But from the fact that preparations of mercury are rendered more soluble by this salt, it is probable that the serious effects were produced by rendering the metal, existing in a latent condition in the systems of those who had previously taken it, more active. Mercurial salivation is frequently occasioned by the administration of this salt to persons who had been subject to mercurial treatment at some prior time. In some constitutions Iodide of Potassium produces certain symptoms termed *iodism*, as "violent vomiting and purging, with fever; great thirst; palpitation; rapid and extreme emaciation; cramps, and small and frequent pulse, occasionally with dry cough, and terminating in death."—*P.* Usually, the unpleasant symptoms occasioned by the use of Iodide of Potassium gradually pass away upon ceasing its use.

Iodide of Potassium is usually given in all cases where iodine is indicated, being less irritating in its action; it appears to be more especially useful in gôitre, strumous enlargement of the glands, strumous sores and eruptions, strumous ophthalmia, syphilitic affections, mammary tumors, enlargement of the liver, amenorrhea, leucorrhea, mercurio-syphilitic sore-throat, mercurial cachexy, and, indeed, all tubercular affections of serous tissues. It is extensively employed in the above forms of disease, alone or in combination with the Compound Syrup of Stillingia, in the proportion of four drachms of the Salt to a pint of the Syrup. When taken for a length of time, and especially if used in rather large doses, it will excite ptyalism, and frequently an affection of the mucous membranes of the air-passages, very much resembling a cold in the head. The dose of it is from two to ten grains; it should always be given in solution and well diluted, and should also be prescribed in the simplest possible form, on account of its numerous chemical relations with other bodies, many of which decompose it, and form insoluble iodides.

Off. Prep.—Liquor Iodinii Compositus; Pilulæ Ferri Iodidi; Tinctura Iodinii Composita; Unguentum Iodinii Compositum.

POTASSII SULPHURETUM. *Sulphuret of Potassium. Hepar. Liver of Sulphur.*

Preparation.—"Take of Sulphur *one ounce;* Carbonate of Potassa *four ounces.* Triturate them well together, and heat them in a covered crucible till they form a uniform fused mass; which, when cold, is to be broken up into fragments and kept in well closed vessels."—*Ed.* There is an unnecessary excess of alkali used in the above process. The preparation may be made equally as well with one-half the quantity of Carbonate of Potassa named.

History.—If carbonate of potassa and sulphur are heated in the proportion to form the tersulphuret, two equivalents of potassa give their oxygen to two equivalents of sulphur; the hyposulphurous acid thus formed combines with one equivalent of potassa to form hyposulphite of potassa, the two equivalents of potassium with six equivalents of sulphur form tersulphuret of potassium, and carbonic acid is evolved, causing the puffing up. 2595 parts of pure carbonate of potassa require 1600 parts of sulphur. On account of the puffing up caused by the evolution of carbonic acid, capacious vessels must be used; for small quantities glass flasks are most convenient, and on the large scale cast-iron vessels. As soon as the mass becomes quietly fluid, it is well, previous to removing from the fire, to try if it is perfectly soluble, free from uncombined sulphur; for this purpose a small portion may be withdrawn and dissolved in water, and then it can be noticed whether there is any precipitate. If the precaution is taken that it does not ignite, when a glass flask is used, little or no sulphuric acid will be formed; if, however, wide open vessels are employed, this can scarcely be prevented, and the hyposulphite of potassa, by absorbing oxygen, becomes partially or entirely converted into sulphate of potassa, and the excess of sulphur is evolved as sulphurous acid. It is also possible that sulphite of potassa may be formed, and according to the length of time it burns, a variable quantity of hyposulphite, sulphite, and sulphate of potassa will be formed in the preparation. Sulphuret of Potassium, through combustion, undergoes the same change into sulphite and sulphate of potassa as the hyposulphite of potassa does. Consequently, Liver of Sulphur, although made with pure materials, should, when containing much sulphate, be rejected as faulty. This is, however, seldom done, as in employing open vessels, the contamination can scarcely be avoided.

The formation of sulphate of potassa is least when the wet method is employed. A portion which on testing is found to be perfectly combined, gives, when evaporated until it becomes brittle on cooling, a liver containing one-seventh its weight of water, which may be removed by heating it until it commences to fuse.—*Witt.*

The wet method referred to by Wittstein is, to place in a vessel one part of sulphur, and two parts, each, of carbonate of potassa and water; heat to boiling, and continue it so long as the mixture puffs up. When on withdrawing a portion and mixing with water it ceases to give a precipitate of sulphur, the heat is raised until the mass is not only brittle on cooling, but forms a limpid fluid in the vessel, which is then withdrawn from the fire and the contents poured into another vessel, the surface of which has been rubbed with oil. If this, when treated with water, still gives off sulphur, half a part of water must be added and again boiled.

Sulphuret of Potassium is a yellow, solid, brittle mass, with a tinge of green; when quite dry it is nearly odorless, of a bitter, strongly alkaline, and disagreeable taste. When damp its smell is very offensive, similar to that of rotten eggs, and which is due to decomposition of this substance during which sulphureted hydrogen is evolved, while sulphur separates. In the air, it gradually absorbs oxygen, and undergoes a series of changes, which end in the formation of sulphate of potassa and free sulphur. It is dissolved by water with the greatest facility, but requires a larger quantity for its solution when it contains much sulphate of potassa; the solution is yellow and fetid. Alcohol of 80 per cent. dissolves the Sulphuret of Potassium from the Liver of Sulphur, leaving the hyposulphite, sulphite, and sulphate of potassa undissolved; all the chloride of potassium (or at least most of it), the carbonate of potassa, and other impurities will be found in the residue. The aqueous and alcoholic solutions have a strongly alkaline reaction. A white deposit in the aqueous solution, unaltered by a large quantity of water, denotes the presence of silica or alumina; a black or gray one is probably iron; a yellow one free sulphur. Carbonate of potassa is detected by the addition of lime-water, which renders the solution turbid. If the Liver of Sulphur when treated with dilute sulphuric acid effervesces without evolving any sulphureted hydrogen, it must be thrown away as useless.—*Witt.* Its formula is KS_3; its equivalent weight 87.

Properties and Uses.—In large doses it is an energetic, narcotico-acrid poison, causing acrid taste, vomiting, mortal faintness, and convulsions, with an emission of the odor of sulphureted hydrogen. In small doses, from two to ten grains in solution, or in pill with soap or liquorice, and repeated three or four times a day, it acts as a general stimulant, increasing the frequency of the pulse as well as the heat of the body, and promoting the different secretions, especially those of the mucous membranes. It is likewise antacid, alterative, and antispasmodic, and has been used in hooping-cough, chronic rheumatism, asthma, obstinate diseases of the skin, painters' colic, gout, etc.—*P.* Externally it has been very efficacious in chronic diseases of the skin, as eczema, scabies, lepra, pityriasis, etc., in which it is used in the form of ointment, wash, or bath. Half a drachm of the sulphuret to an ounce of lard, forms an ointment; the same quantity to a fluidounce of water, forms a wash or lotion. One part of the sulphuret to one thousand of water, forms a bath.

PULVERES.

Powders.

Medicines which have no nauseous or unpleasant taste, no acrid or destructive action, which are not deliquescent, and which can be given in not too bulky doses, are usually more advantageously administered in fine powder. When an article is reduced to powder, it has a much greater surface exposed to the influence of light and of the atmosphere than when in the crude, aggregate mass; and as most, if not all powders, are more or less injured by the action of these agents, it is always better to keep them in well-closed tin cans, or in well-stopped bottles, which are covered externally with a coat of black paint, varnish, or black paper, etc. Were druggists to pursue this rule, they would find it very advantageous in many respects. Some agents, notwithstanding even these precautions, lose their virtues rapidly when in the state of powder; such should be pulverized in small quantities at a time, and only as they are required. As a general rule, the finer the powder, or the longer it is triturated, the more active it becomes. And in the various preparations of the alkaloids and resinoids, care must be taken, in all instances, to triturate for at least nearly half an hour, which renders them much more energetic and effectual in their results. M. Dorvault thinks that the operation of pulverization effects an actual change in the chemical and therapeutical properties of many agents. Sugar is less soluble in water, and less sweet, when long pulverized or triturated—and, he inquires, is this to be referred to an altered electrical condition of the sugar, as the phosphorescence developed during the act of pulverization in the dark would lead us to suppose? Gum Arabic, powdered, has not the same taste, nor the same solubility as when in the entire state. If a given quantity of water may be made to dissolve forty parts of arsenious acid in the vitreous state, the same quantity of water can be made to dissolve only fourteen parts after pulverization.—(*Annals of Pharmacy*, *May*, 1852). Changes of this kind may ensue from the action of light, the oxygen of the atmosphere, its nitrogen, or its electricity, etc., upon matter reduced to such a state of fineness that nearly every part of it is exposed to the peculiar agent which effects these changes.

When but one article is reduced to powder, it is termed a *simple powder*, when several articles in powder are rubbed up together, the mixture is termed a *compound powder*. As the substances entering into the formation of a compound powder, may be of various textures and densities, it is generally preferable to reduce each, separately, to a powder, and then mix and triturate them together thoroughly. Some articles, however, require the intervention of another before they can be reduced to powder, as camphor, which is pulverized by the addition of a few drops of alcohol; or camphor and opium which require the addition of sugar or gum Arabic; others again, are powdered with facility by the aid of a harder substance. Medicines that contain considerable fixed oil, or which are deliquescent, should never be prescribed in the form of powders, more especially when they are to be retained for any length of time, as the former may injure the powder in consequence of rancidity, while the latter may render it damp, moldy, and inert. Articles which are *incompatible* should never be united together, unless the decomposing compound is required. When volatile or deliquescent substances are prescribed in powders, as camphor, carbonate of ammonia, or carbonate of potassa, they should be divided in waxed papers, and inclosed in tin foil, a tin box, or a wide-mouthed vial before delivering them. The paper used for powders of ordinary character, should be very smooth, or glazed, to prevent the powder from adhering to it, and sufficiently soft and yielding to be opened or closed readily, without springing so as to throw out any portion of the powder. Some apothecaries fold up their powders in foolscap paper, and these, when opened by the patient, in consequence of their stiffness, spill or throw out a very material proportion of the medicine. When a powder is prescribed in bulk, leaving it to the patient to apportion the dose, unless otherwise desired, it should always be put into a wide-mouthed vial.

The old absurd and unscientific style of combining eight or ten articles in one preparation is fortunately becoming unpopular, and though a few preparations of the kind are retained, yet the major amount of our present compounds consist of but two or three, and never exceeding four substances; in the former, the articles were too frequently thrown together without any guide or rule, or any regard to compatibilities, and though benefit might be derived from these heterogeneous mixtures, it was always difficult to ascertain upon which article or articles the effect depended, or whether it was owing to a third agent, the result of decomposition.

In preparing powders, it will be best to dry the article, beat it in an iron or brass mortar for a time, then sift it through a fine sieve; again beat the coarser parts in the mortar for a short time, sift again; and so continue alternately pulverizing and sifting until the whole is reduced to fine powder. The same course should be pursued in triturating. When very active articles, such as strychnia, chloride of gold, atropia, etc., are to be given in the form of powders—gum, sugar, sugar of milk, starch, or marsh-mallow should be triturated with them, in order to facilitate their reduction to minute division.

The usual vehicle for taking the lighter powders is an agreeable thin liquid, as water, gruel, milk, etc. Heavy powders require a more consistent vehicle as syrup, molasses, thick mucilage, etc.; always bearing in mind whether the vehicle be compatible with the active ingredients of the powder.

PULVIS ASCLEPIÆ COMPOSITUS. *Compound Powder of Pleurisy Root.*

Preparation.—Take of Pleurisy Root, and Spearmint, each in powder, and Sumach Berries, of each, *two ounces;* Bayberry Bark and Skunk Cabbage, each, in powder, *one ounce;* Pulverized Ginger *half an ounce.* Mix them.

Properties and Uses.—Very useful diaphoretic in coughs, colds, and as a drink in febrile diseases. Two drachms of the powder may be infused in half a pint of boiling water, sweetened, and drank in wineglassful doses, every hour or two. Or in common colds, the half pint of warm infusion may be taken at a draught, and repeated in an hour if necessary. —*W. S. M.*

PULVIS CAMPHORÆ COMPOSITUS. *Compound Powder of Camphor.*

Preparation.—Take of Tannic Acid, Kino, Camphor, each, in powder, *one scruple;* Opium, in powder, *half a scruple.* Mix well together, and divide into twenty powders.

Properties and Uses.—These powders are stimulant, antispasmodic, anodyne and astringent, and have proved highly successful in the treatment of Asiatic cholera, cholerine, and severe cholera-morbus. They speedily check the discharges, and relieve the pains or cramps. The dose is one powder, to be given after each discharge from the bowels, or oftener if the urgency of the case require it. The powders may be given in molasses, quince syrup, or blackberry jelly. Where more stimulus is required, one or two grains of capsicum may be added to each dose.—*J. K.*

PULVIS CARBONIS LIGNI COMPOSITUS. *Compound Powder of Charcoal.*

Preparation.—Take of Charcoal *two ounces;* Rhubarb, in powder, *one ounce;* Bicarbonate of Soda *half an ounce.* Mix together.

Properties and Uses.—This preparation will be found very beneficial in dyspepsia, attended with acidity of the stomach, loss of appetite, constipation or diarrhea, and distress of the stomach after eating. It will prove useful in all derangements of the digestive functions where acidity of the stomach is present. The dose is a teaspoonful in water or Indian-meal gruel, three or four times a day. If cream of tartar one ounce, be substituted for the bicarbonate of soda, it will form an excellent laxative powder for piles.—*J. K.*

PULVIS CYPRIPEDII COMPOSITUS. *Compound Powder of Yellow Ladies'-Slipper. Nerve Powder.*

Preparation.—Take of Yellow Ladies'-slipper Root, Pleurisy Root, Skunk-Cabbage Root, and Scullcap, each, in powder, *one ounce.* Mix them.

Properties and Uses.—This powder is useful to allay irritability or excitability of the nervous system, to relieve spasms, and to produce sleep in restless, wakeful, or excited conditions. When acidity of the stomach is present, it is common to add bicarbonate of soda, an ounce. The dose is from half a drachm to a drachm three times a day, or as required; it is usually administered in tea or water.—*J. K.*

PULVIS HYDRASTIS COMPOSITUS. *Compound Powder of Golden Seal.*

Preparation.—Take of Golden Seal, Blue Cohosh, and Helonias, each, in powder, *half an ounce.* Mix together.

Properties and Uses.—This powder is tonic and antispasmodic. It will be found very efficient in dyspepsia, chronic inflammation of the mucous membrane of the stomach, and will afford much relief in cases of distress of the stomach after eating, and in aphthous inflammations of the mouth. It may also be administered to prevent a relapse, in bilious colic. The dose is from half a drachm to a drachm, three or four times a day, in water, tea, or wine, as the case may require.—*J. K.*

PULVIS HYDRASTINI COMPOSITUS. *Compound Powder of Hydrastin.*

Preparation. — Take of Hydrastin, Cornin, and Myricin, each, *one scruple.* Mix together and divide into twenty powders.

Properties and Uses.—Stimulant, tonic, and exerting an influence on mucous membranes. It will be found useful in chronic gastritis, and some forms of dyspepsia, jaundice, etc. The dose is one powder, every two, three, or four hours, as the case may require. It will also be found an excellent tonic during convalescence from exhausting diseases.

PULVIS IPECACUANHÆ COMPOSITUS. *Compound Powder of Ipecacuanha.*

Preparation.—Take of Pleurisy Root, Blood root, Ipecacuanha, Nitrate of Potassa, each, in powder, *one drachm.* Mix them.

Properties and Uses.—This powder has both diuretic and diaphoretic effects upon the system; it is useful in febrile and inflammatory diseases, and especially in cases where, from idiosyncrasy or other causes, opium is inadmissible. The dose is ten or fifteen grains every hour or two.

PULVIS IPECACUANHÆ ET OPII COMPOSITUS. *Compound Powder of Ipecacuanha and Opium. Diaphoretic Powder.*

Preparation.—Take of Opium, in powder, *ten grains;* Camphor, in powder, *two scruples;* Ipecacuanha, in powder, *one scruple;* Bitartrate of Potassa *eight scruples.* Mix them.—*Beach's Am. Prac.*

Properties and Uses.—This powder is an excellent anodyne and diaphoretic, and is perhaps, superior to any other preparation in its diaphoretic effects upon the system. It is of great efficacy in all febrile and inflammatory diseases, diarrhea, dysentery, cholera-morbus, gout, rheumatism, after-pains, all cases of nervous irritability or excitement, and wherever an anodyne conjoined with a diaphoretic is indicated. It favors perspiration without augmenting the heat of the body. The above is the original formula, but practitioners vary in preparing it according to their favorite views; thus some omit the cream of tartar and substitute nitrate of potassa, or bicarbonate of soda, while others omit the opium, substituting in its place lactucarium, or twice the quantity of cypripedin. Dose, three to five grains every three or four hours in febrile or inflammatory diseases; and in some cases, ten grains, three times a day. Its action may be materially promoted as a diaphoretic by warm drinks, such as catnip, balm, or sage tea, lemonade, etc., which, however, should not be given immediately after the administration of the powder, lest vomiting be provoked. In rheumatism, pneumonia, cerebral affections, hepatic disease, etc., it is frequently combined with small doses of podophyllin.

In preparing the powder, the camphor must first be reduced to powder by trituration with a few drops of alcohol, then add a small portion of the Bitartrate of Potassa, continue the trituration until the camphor has been still further divided, add the opium in powder, then the ipecacuanha, and lastly, the remainder of the bitartrate, and triturate all together for fifteen or twenty minutes.

PULVIS JALAPÆ COMPOSITUS. *Compound Powder of Jalap. Antibilious Physic.*

Preparation.—Take of Alexandria Senna, in powder, *two ounces;* Jalap, in powder, *one ounce;* Cloves or Ginger, in powder, *one drachm.* Mix them.—*Beach's Am. Prac.*

Properties and Uses.—This forms an excellent purgative, useful in nearly all cases where such action is required. It acts with mildness and efficacy, influencing the whole alimentary tract, cleansing it of all abnormal accumulations, and stimulating the whole biliary apparatus to healthy action. It may be given to either sex, and at all ages; and is used in all febrile, inflammatory or chronic diseases, being contra-indicated in severe gastric or intestinal inflammation, and requires to be used cautiously and in moderate doses, during pregnancy, menorrhagia, and certain other disease. Dose, one drachm, put into a gill of boiling water, and allowed to stand till cold, then sweeten if desired, stir, and drink the whole contents. Milk, wine, cider, lemonade or coffee, etc., may be substituted, in proper cases, for the water. In febrile diseases its utility will be much increased by adding about ten grains of bitartrate of potassa to each dose.

PULVIS LEPTANDRINI COMPOSITUS. *Compound Powder of Leptandrin.*

Preparation.—Take of Leptandrin, in powder, *one drachm;* Podophyllin, in powder, *half a drachm;* Sugar of milk *five drachms.* Mix, and triturate well together.

Properties and Uses.—This preparation is a cholagogue cathartic, of immense benefit in epidemic dysentery, in doses of eight grains, repeated every hour or two, until it operates freely; after which it may be given two or three times a day. It may likewise be used with advantage in typhoid, remittent, and intermittent fevers, with or without the addition of sulphate of quinia, also in all biliary derangements. The addition of three grains of *Santonin* to each dose, and given twice a day, forms an admirable anthelmintic.—*J. K.*

PULVIS LOBELIÆ COMPOSITUS. *Compound Powder of Lobelia. Emetic Powder.*

Preparation.—Take of Lobelia, in powder, *six drachms;* Bloodroot and Skunk Cabbage, in powder, each, *three drachms*; Ipecacuanha *four drachms;* Capsicum, in powder, *one drachm.* Mix them.

Properties and Uses.—This forms an excellent emetic, and may be used in all cases where an emetic is indicated; it vomits easily and promptly, without causing cramps, or excessive prostration. The dose is two drachms, one-fourth of which (half a drachm) must be given every fifteen minutes, in an infusion of boneset. Warm boneset drank freely during the time of taking it, will very much facilitate its operation; and it will also be found that, in many cases, temperate water (at 60°) will be equally as effective in assisting the induction of emesis as the infusion, and much more agreeable.—*J. K.*

PULVIS MYRICÆ COMPOSITUS. *Compound Powder of Bayberry. Cephalic Powder.*

Preparation.—Take of Bayberry Bark and Bloodroot, each, in powder, *one drachm.* Mix them.—*Beach's Am. Prac.*

Properties and Uses.—This powder is used either alone or combined with an equal part of common snuff, as a snuff in catarrh, headache, polypus, etc. In obstinate affections of the nasal mucous membrane, it is frequently combined with sesquicarbonate of potassa one or two drachms, and golden seal, half an ounce.

PULVIS NIGRUM. *Black Powder. Emmenagogue Powder.*

Preparation.—Take of Flowers of Sulphur, Myrrh, Steel Filings, Loaf Sugar, each, in fine powder, *one ounce;* White Wine *half a pint.* Mix together, and by means of a gentle heat, evaporate till nearly dry. Pulverize the mass when cold, and keep it in well stopped bottles.—*Beach's Am. Prac.*

Properties and Uses.—This compound has been used with much success in the treatment of primary or idiopathic amenorrhea, chlorosis, etc. The dose is half a drachm, to be repeated three times a day; it may be taken in syrup, or molasses, or in the form of pills. It will also be found an excellent remedy in several forms of cutaneous disease.

PULVIS PODOPHYLLI COMPOSITUS. *Compound Powder of Mandrake.*

Preparation.—Take of Blue Flag, Mandrake, Bitter-root, Swamp Milkweed, each, in powder, *one ounce;* Bloodroot *half an ounce.* Mix together.

Properties and Uses.—This powder is cathartic and alterative, and is very valuable in cases of obstinate constipation, hepatic derangements, dyspepsia, worms, and in scrofulous, rheumatic, and syphilitic affections. The dose is half a drachm or a drachm, repeated three times a day; it may be administered in water or tea.—*J. K.*

PULVIS PODOPHYLLINI COMPOSITUS. *Compound Powder of Podophyllin. Hydragogue Powder.*

Preparation.—Take of Podophyllin *four grains;* Bitartrate of Potassa *three drachms.* Mix intimately together.

Properties and Uses.—This is an active hydragogue, and is frequently employed in dropsy, obstructed menstruation, etc. Dose, one scruple; administered every two hours, until it operates sufficiently. The addition of about one or two grains of Capsicum to each dose, will render it much more speedy in its operation.

PULVIS QUINIÆ COMPOSITUS. *Compound Powder of Quinia.*

Preparation.—Take of Sulphate of Quinia, Ferrocyanuret of Iron, each, *one drachm.* Mix thoroughly together.

Properties and Uses.—This powder is tonic, febrifuge, and antiperiodic. It is much employed by American practitioners in febrile and inflammatory diseases, and in all diseases in which there is the least tendency to periodicity. As a tonic it is either used alone, or frequently in combination with other tonics, as hydrastin, cornin, etc. The dose is from three to six grains of the powder, repeated two, three or four times a day according to symptoms. It was introduced to the profession as an agent in the above diseases, by the late Prof. I. G. Jones, of Columbus, Ohio.

PULVIS RHEI COMPOSITUS. *Compound Powder of Rhubarb. Neutralizing Powder.*

Preparation.—Take of Rhubarb, Bicarbonate of Potassa, and Peppermint Leaves, each, in powder, *one ounce.* Mix together. *Beach's Am. Prac.*

Properties and Uses.—This powder is an invaluable remedy in diarrhea, cholera-morbus, dysentery, summer-complaint of children, acidity of stomach, heart-burn, and as a mild cathartic during pregnancy. The dose is from half a drachm to two drachms, every one, two, or three hours, as may be required. (*See Syrup of Rhubarb and Potassa.*)

PULVIS STYPTICUS. *Styptic Powder.*

Preparation.—Take of Sulphate of Iron, in powder, *two ounces;* Alum, in powder, *one ounce.* Mix them, and calcine by a red heat, as named for Red or Styptic Powder, under the head of Sesquioxide of Iron, *which see.* When cold, pulverize the mass, and keep it in well stopped bottles.

Properties and Uses.—This powder is styptic, and is frequently employed in the treatment of external hemorrhages, and bleeding piles, either alone, or in combination with stramonium-ointment, poke-ointment, oil of fireweed, etc. Given internally, in doses of three grains, combined with capsicum one grain, it has proved effectual in passive hemorrhages from the lungs and uterus.

PULVIS XANTHOXYLINI COMPOSITUS. *Compound Powder of Xanthoxylin.*

Preparation.—Take of Xanthoxylin, Hydrastin, and Sulphate of Quinia, each, *one drachm;* Sugar of Milk *a sufficient quantity.* Mix together, adding just enough Sugar of Milk to form a powder, and then divide into sixty powders.

Properties and Uses.—This is a most valuable stimulating tonic and alterative, and may be employed in all cases requiring such actions—as in debility of the digestive functions, dyspepsia, convalescence from fevers, diarrhea, and dysentery, hepatic torpor, periodical headache, scrofula, and other chronic diseases accompanied with excessive debility. The dose is one powder, to be repeated three or four times a day; it may be given in water, milk, molasses, syrup, or wine, as symptoms may indicate. One powder contains a grain, each, of xanthoxylin, quinia, and hydrastin. —*J. K.*

QUINIA.

Salts of Quinia.

Quinia is one of our most valuable remedies, and is obtained from the Yellow Peruvian-bark; the pure Quinia is seldom used; but its salts are more generally employed, especially those a description of which immediately follows. The *Acetate*, *Ferrocyanate*, *Nitrate*, *Muriate*, *Lactate*, *Citrate*, *Iodide*, and *Phosphate*, have also been employed and recommended; but none of them has yet gained a standard reputation.

To prepare the *Ferrocyanate of Quinia*, place in a very small quantity of water one drachm of sulphate of quinia, and three drachms of ferrocyanuret of potassium; boil the mixture; an oily, greenish-yellow matter subsides, from which the supernatant fluid must be decanted; wash the oily precipitate with distilled water, then add to it strong alcohol and dissolve by a heat of 100° F., filter as soon as all is dissolved, and evaporate the filtrate. A solution of tannic acid, or infusion of galls, added to a solution of quinia, precipitates *Tannate of Quinia*, which must be washed with distilled water and dried. The other salts above named may be procured by adding quinia to the diluted acids, respectively, concentrating, crystallizing, washing, and drying. Their doses, respectively, are the same as those of the sulphate of quinia. The *Iodide of Quinia* is obtained by adding a Solution of twenty-four parts of Iodide of Potassium in eight of Water, by drops, to a strong Solution of twenty parts of Bisulphate of Quinia. Wash the precipitate quickly, and dry it in the shade. It is tonic, alterative, and resolvent, and has been found of efficacy in scrofulous enlargement of the glands, in doses of from half a grain to two grains. Or, it may be made by decomposing a Solution of one equivalent of Muriate of Quinia with a Solution of four equivalents of Iodide of Potassium. When dry, Iodide of Quinia thus prepared, has the properties of a resin, is easily reduced to a white, inodorous powder, extremely bitter, and permanent in the air. It is very soluble in water, alcohol, or ether, forming clear and colorless solutions, which deposit the Iodide of Quinia on evaporation. Concentrated sulphuric and nitric acids, and chlorine, decompose it instantly, with elimination of iodine.

Off. Prep.—Ferri et Quiniæ Citras; Ferri et Quiniæ Tartras; Quiniæ Murias; Quiniæ Sulphas; Quiniæ et Morphiæ Tartras; Quiniæ et Saliciniæ Tartras; Quiniæ Valerianas.

QUINIÆ SULPHAS. *Sulphate of Quinia.*

Preparation.—Coarsely powdered Yellow Calisaya-Bark *five pounds*, are digested for one day, at a gentle heat, in a leaden vessel, with *twenty pounds* of Water, acidulated with Concentrated Sulphuric Acid *thirteen fluidrachms;* then strain the liquid in a linen bag, strongly press the residue, and treat it a second time with Water *fifteen pounds*, acidulated with Concentrated Sulphuric Acid *nine fluidrachms*, strain again, and press;

treat the third time with *fifteen pounds* of pure Water. The various infusions are to be mixed and boiled down to *five pounds*, allowed to rest quietly for some days, filtered, and supersaturated with a solution of Caustic Soda. When the Soda solution no longer causes a turbidness, the precipitate is allowed to subside, collected on a filter, washed with cold water and dried. The dried mass is finely powdered, digested with ten times its weight of Alcohol of 90 per cent., with a gentle heat for one day, filtered, and the residue well washed with alcohol; sufficient Sulphuric Acid is now added to give a faintly acid reaction to the alcoholic solution, then add one-fourth its weight of water, and distill off the alcohol. The residual aqueous solution, which contains a mass of fine crystals, is poured into a porcelain dish, and the retort rinsed with water; the dish is warmed on a sand-bath as long as its contents smell of alcohol; it is then set aside in a cool place for a few days, the crystalline mass which forms is then thrown on a cloth, and the colored liquor removed by pressure. The yellow crystals are formed into a magma with water, again pressed, warmed with a large quantity of water, and caustic soda solution added until a strong alkaline reaction is obtained; after digesting some hours, the yellow precipitate is thrown on a filter, washed, dried, dissolved in alcohol of 90 per cent., the solution filtered, sulphuric acid added as before, then water, and the spirit distilled off, the residual mass freed from mother-liquor by pressure, and dried. If not yet white, the same treatment with caustic soda, etc., must be repeated, when it will be obtained quite pure.

History.—In this process the Yellow Calisaya-bark is employed in preference, on account of its containing a greater amount of quinia than the other barks, and holding it in combination with less cinchonia. As found in the bark, the quinia is united with kinic acid, and perhaps some coloring matter; the compound is slightly soluble in boiling water, but readily so in dilute acids; the solutions yield to soda a precipitate of the alkaloids (quinia and cinchonia) combined with some of the tannic acid (more or less decomposed) named quinia red, the greater part of this latter substance remains in the alkaline solution. Strong alcohol takes up the alkaloid (together with the greater part of the adhering coloring matter), with which the sulphuric acid forms a sulphate. After removing the alcohol, the greater part of the quinia (as a basic sulphate) crystallizes; the sulphate of cinchonia, with most of the coloring matter and a little Sulphate of Quinia, remains in the mother-liquor. The further treatment effects the entire purification of the salt. The yield varies, ranging between one and three per cent. of the bark used.

The mother-liquors are mixed, treated with excess of soda, and the precipitation (impure quinia and cinchonia) reserved for the next preparation of quinia; or it is precipitated with caustic ammonia, the resinous mass (a combination of quinia-red, tannic acid, resin, etc.) well washed with water, dried, and used as *Chinoidin.*

In general the alkaloid is thrown down with lime instead of soda, when of course hydrochloric acid must be substituted for sulphuric; this entails a slight loss, the quinia being somewhat soluble in lime-water as well as in caustic potassa and ammonia; soda possesses the advantage of abstracting the coloring matter better than the other alkalies, and not dissolving any of the alkaloid.—*Witt.*

In the same manner, Sulphate of Quinia may be procured from the dark and pale barks; but, with the exception of the Calisaya, all the other varieties will afford a large proportion of *Sulphate of Cinchonia*, held in solution by the mother-waters after the crystallization of the quinia.

Mr. E. Herring has proposed a process for making Sulphate of Quinia without alcohol. The value of this process is greater in England, where the excise duty on alcohol is so enormous as to make it an important object to avoid its use in manufacturing. The powdered cinchona-bark is boiled with a solution of caustic soda, and then pressed and washed with water until the whole of the coloring matter of the bark has been removed. The bark after this treatment retains the greater part of the alkaloids in a free state. The blood-red alkaline decoction and the washings contain a little of the alkaloids, and are subsequently treated. The bark is next boiled in dilute sulphuric acid, until completely exhausted of the alkaloids. The acid decoction is concentrated, filtered, and precipitated with caustic soda. The precipitated alkaloids are next combined with sulphuric acid and the sulphates of quinia, quinidin, and cinchonia, separated from each other by repeated crystallization, and the quinia salt, previous to its last crystallization, is decolorized with pure animal charcoal.

To obtain the portion of alkaloids held in solution in the colored alkaline liquors, they are treated with muriatic acid in excess, filtered, and precipitated with hydrate of lime. This precipitate, after being washed, pressed, dried, and powdered, is treated with benzole, which dissolves the alkaloids. The benzolic solution is then agitated with diluted sulphuric acid, to remove the alkaloids, and the supernatant benzole separated by decantation. The alkaloids are then precipitated from the acid solution with caustic soda, and treated as previously noted to separate the quinia salt.—*Am. Jour. Pharm. XXVI.*, 10.

Pure Sulphate of Quinia is a white, light salt, consisting of delicate, satiny needles, intermixed, and belonging to the oblique rhombic system. It is odorless, and of an intensely bitter taste; when heated it readily fuses, giving off eight equivalents of water, and retaining two; at a higher temperature it becomes red, and burns without a residue. It slightly effloresces in the air; is soluble in 740 parts of water at 60°—30 parts at 212°—and 80 parts of cold alcohol sp. gr. 0.850. The solutions have a neutral reaction, and the boiling solution deposits crystals on cooling. A slight addition of acid assists its solubility in water to a great degree; it has the property of giving a blue tinge to the surface of water. The salt used in medicine is a disulphate of quinia. "A neutral sulphate, sometimes incorrectly called *Bisulphate or Supersulphate of Quinia*, is obtained by adding to a concentrated boiling solution of the disulphate, as much sulphuric acid as enters into its constitution, that is, one equivalent. On concentrating the solution, rhombic prisms are formed, consisting of one equivalent of base, one of acid, and eight of water, and which are soluble in their own water of crystallization at 212°, and in ten parts of water at 60°."—*C.* The officinal or disulphate of quinia, or as it is commonly termed by medical men, Sulphate of Quinia, consists of two equivalents of quinia, one of sulphuric acid, and eight of water; its formula is $2\ NC_{20}\ H_{12}\ O_2\ SO_3$; its equivalent weight is 436.

Sulphate of Quinia is *incompatible* with infusion of galls, acetates, lime-water, soda, potassa, ammonia, etc. The London College gives the following tests of the purity of Sulphate of Quinia: "It is dissolved by water, especially when mixed with an acid. Quinia is thrown down by ammonia; the liquor being evaporated ought not to taste of sugar. One hundred parts of the salt lose eight or ten parts of water by a gentle heat; a high heat destroys it. Chlorine being first added to it, and afterward ammonia, it becomes green." Vogel's test is, to place pure Sulphate of Quinia in a test tube, with water, so that the greater part of the crystals remain undissolved; some drops of this fluid, after having shaken it, are placed in a watch-glass, and so much concentrated, and freshly prepared chlorine water, free from muriatic acid added, that a clear, somewhat yellowish solution results. When into this chlorinated quinia solution some finely powdered ferrocyanuret of potassium is introduced, it acquires a bright rose-red color. The rose-red color passes over soon, and particularly rapidly, if still more of the powdered ferrocyanuret be added, into a deep dark red, which after several hours, gradually becomes converted into green; a solution of cinchonia is not thus acted upon.

The high price of Sulphate of Quinia has led to various adulterations; those referred to in the following statement of chemical reactions are the more common. *Cinchonia* is known by shaking the salt with five parts of water and one part of ammonia, filtering, washing the precipitate, and agitating it with ether, when this alkaloid will cause the solution to be turbid. The ammonia decomposes the salt and throws down quinia and cinchonia, the former being soluble, and the latter insoluble in ether; the precipitate must of course be first freed by washing, from the sulphate of ammonia formed, as this is also insoluble in ether. Or, it may be detected, by precipitating a solution of the suspected quinia in water, by potassa; collect the precipitate, and boil it in alcohol. The quinia remains in the mother-liquor, while, as the liquid cools, the cinchonia crystallizes in short rhombic prisms or pearly scales—forms which are never assumed by Sulphate of Quinia. *Salicin* is detected by the blood-red solution it forms with cold concentrated sulphuric acid, with which *starch*, *sugar*, *stearine*, or other organic matters are, on the other hand, colored brown or black. *Veratria* and *piperin*, produce the same reaction as salicin, but the presence of salicin may be verified by adding to the salt a small portion of bichromate of potassa and sulphuric acid, and heating, when, if salicin be present the peculiar odor of hydruret of salicyle or oil of meadow-sweet will be perceptible. *Sugar* imparts a sweet taste to water, especially after the quinia has been precipitated by carbonate of potassa; *starch* and *stearine* remain dissolved by diluted sulphuric acid, the former gives a blue color with iodine, the latter fuses to an oil in hot water. *Gypsum*, *chalk*, *magnesia*, *sulphate of soda*, and *phosphate of lime* are known by their insolubility in alcohol; and on heating with the blow-pipe the quinia is burned and dissipated, while the earthy matters are left. *Borax* also remains on heating the salt to redness, and forms with alcohol a solution burning with a green flame. *Arsenic* may be detected by Marsh's apparatus. Or arsenic may be detected by adding the Sulphate of Quinia to water, agitating it, and passing sulphureted hydrogen into it; a yellow color is produced if arsenic be present; if a few drops of concentrated hydrochloric acid be added to this a yellow precipitate will take place. This precipitate is soluble in aqua ammonia, forming a clear solution, and yields metallic arsenic when dried and heated with either soda-flux or potassa-flux.—*Witt*—*P.* Christison gives the following convenient test for determining the purity of Sulphate of Quinia: "Twenty parts of boiling water acidulated with sulphuric acid dissolve it entirely and without any floating oily globules appearing, if there be no fatty matter present; the solution when cold, does not become blue with tincture of iodine if free of starch; it does not precipitate with oxalic acid if free of lime; and when treated with solution of baryta so long as a precipitate forms, which precipitate is a mixture of quinia and sulphate of baryta, the liquid has not a sweet taste, if free of sugar or mannite." Ammoniacal salts are recognized by the ammoniacal odor evolved by the action of caustic potassa. Quinidin is an alkaloid obtained from cinchona, and with which Sulphate of Quinia is often adulterated. *See page* 275. See also *Am. Jour. Pharm. XXV.*, 161.

To distinguish Sulphate of Quinia from quinidin the following tests have been given. Sulphate of Quinia dissolved in an aqueous solution of chlorine, and a few drops of ammonia added, furnishes a deep green color characteristic of quinia. Sulphate of quinidin treated in the same manner remains colorless if free from quinia. Sulphate of Quinia dissolved in acetic acid, a few drops of tincture of iodine added, the mixture heated and allowed to cool, furnishes a beautiful emerald-green crystalline compound, Herapath's sulphate of iodo-quinia. Sulphate of quinidin treated in the same manner furnishes a brown precipitate.—*Ed. N. Kent.* Quinia separates from its hydro-alcoholic solution in the form of a syrup-like liquid, which preserves its transparency on drying in the air. Quinidin separates from its hydro-alcoholic solutions in the form of anhydrous, rectangular or rhomboidal prisms. Quinia is soluble in every proportion in cold ether and absolute alcohol, and almost in every proportion of alcohol at 90°; quinidin requires 140 to 150 parts of cold ether, 45 parts of absolute alcohol, and 105 parts of alcohol of 90° to dissolve it. Crystallized Sulphate of Quinia (Liebig's bibasic, Regnault's neutral) is soluble in 57 parts of cold absolute alcohol, and in 63 parts of alcohol of 90°; the corresponding sulphate of quinidin is soluble in 30 to 32 parts of absolute alcohol, and in 7 parts of alcohol of 90°. Sulphate of Quinia is soluble in 265 parts of cold, and in 24 parts of boiling water; sulphate of quinidin is soluble in 73 parts of cold, and in 4.20 of boiling water. Oxalate of quinia is insoluble in water; oxalate of quinidin is very soluble, and crystallizes readily on evaporating and cooling.—*Am. Jour. Pharm.*, *XXV.*, 454. Mix extra light ether and aqua ammonia, of each a drachm, in a vial, and add six grains of the suspected quinia, shaking the whole well together. The quinidin, if any be present, will remain undissolved in the form of a powder, more or less crystalline.

Properties and Uses.—Sulphate of Quinia is febrifuge, tonic, and antiperiodic. Small doses frequently repeated, strengthen the pulse, increase muscular force, and invigorate the tone of the nervous system. In some persons it induces headache, sickness, or irregular action of the bowels; which effects are generally obviated by combining it with morphia, extract of stramonium, or both; and these effects will be almost certain to follow if gastro-enteritic irritation pre-exists. Large doses, as one scruple, or half a drachm, produce many unpleasant symptoms, and ought never to be used; among these may be named sickness and pain at the stomach, giddiness, flushed countenance, palpitation, a sense of distension in the head, intense weighty headache, ringing in the ears, vomiting, numbness in the feet, deafness, blindness, and delirium. The evil results following large doses, or the injudicious administration of quinia has caused many physicians to reject it altogether, in their practice. This is wrong. Quinia is a safe and very superior remedy, in proper hands. As well might we reject all active and useful agents, because, when improperly used, they produce deleterious consequences. Again, the quinia, especially that imported into this Western country for many years past, has been much adulterated with agents calculated to cause the mischief attributed to the salt; and, it must also be remembered, that many of the symptoms following the use of quinia, are the legitimate results of disease itself, as an enlarged spleen, a deranged condition of the nervous system, etc., or are the deplorable consequences of a combined mercurial treatment, which has been and still continues to be a fashionable practice in many portions of this section of country. No sensible or well educated physician will ever object to the proper employment of the pure Sulphate of Quinia.

With many patients, the beneficial influence of this agent will not be observed until cinchonism has been produced, known by giddiness, a buzzing or ringing in the ears, slight headache, etc.; while with others it produces good effects independent of the production of these symptoms.

When taken internally it is absorbed, and may be detected in the sweat and urine.

Sulphate of Quinia in American practice is used in all febrile diseases, without regard to the violence of the fever, or the degree of congestive enlargement of the liver or spleen; it is usually given during the intermissions or remissions, and in doses sufficient to affect the head, each day; when for that day its administration is omitted; but should there be no apparent remissions, it is then given daily to produce the same influence upon the head, without, as before said, regard to the violence of the fever, etc. Previous to its administration, however, any symptoms of irritability, wakefulness, or restlessness, must first be subdued. It is frequently given in these cases, as well as in many other forms of disease, in combination with ferrocyanuret of iron; and was first introduced to the profession, as a safe and efficacious remedy in this class of maladies, by Prof. I. G. Jones. In typhus and typhoid fever, it will be found of much service, in conjunction with small doses of leptandrin or podophyllin, sufficient to produce a daily alvine evacuation. In febrile relapses, acute rheumatism, neuralgia, dyspepsia, debility, convalescence from most acute and chronic diseases, dysentery, and in all epidemic diseases, and every disease characterized by periodicity, it may be given with every expectation of success. Combined with morphia, I have used it successfully in epilepsy, delirium tremens, and the convulsive diseases of intemperate persons. In dysmenorrhea, in conjunction with extract of stramonium or belladonna, and cimicifugin, it proves almost a specific. It is generally contra-indicated during the presence of gastric inflammation, or unusual irritation of the stomach; though the addition of morphia, in such cases, will sometimes prevent any hurtful consequences.

As a tonic, Sulphate of Quinia will be found useful in all diseases connected with an enfeebled state of the system, and especially in the debility resulting from exhausting diseases; in chlorosis, and in anemic conditions it should be given in union with chalybeates. Externally, Sulphate of Quinia in solution, has formed a valuable application to indolent ulcers, buboes, chancres, and chronic mucous inflammations. The dose of it internally, is from half a grain to three grains, repeated every one, two, three, or four hours, as the urgency of the case may require. Large doses are improper.

A solution of Sulphate of Quinia may be made by adding twenty grains of the salt to one fluidrachm of elixir of vitriol, and when dissolved, add two fluidounces of water. The dose of this solution is twenty drops every hour, in about half an ounce of water, or syrup of ginger. Another solution may be made by dissolving Sulphate of Quinia, tartaric acid, of each, twenty grains, in two fluidounces of water. The dose is as above. The acetate, nitrate, phosphate, ferrocyanate, citrate and muriate of quinia, possess similar properties, but are not usually preferred in practice.

Off. Prep.—Pilulæ Quiniæ Sulphatis; Pilulæ Quiniæ Compositæ;

Pilulæ Valerianæ Compositæ; Pulvis Quiniæ Compositus; Pulvis Xanthoxylini Compositus; Tinctura Quiniæ Composita.

QUINIÆ ET MORPHIÆ TARTRAS. *Tartrate of Quinia and Morphia.*

Preparation.—Take of pure crystallized Tartaric Acid, dried, *one hundred and fifty-six grains;* pure Quinia *one hundred and sixty-two grains;* pure Morphia *two hundred and ninety-two grains;* Water *a sufficient quantity.* Add the Acid and the Alkalies to the Water, and boil together. When the whole is dissolved, evaporate at a low temperature, till the Solution is of the consistence of thick syrup, then spread it in layers on glass or porcelain plates, and dry in the shade.—*J. M. Sanders.*

History.—This valuable, non-crystallizable, double-alkaloidal salt is obtained in beautiful transparent scales or plates, holding each alkaloid in its equivalent proportion. It is inodorous, having a slightly bitter taste, and is very soluble in water.

Properties and Uses.—Tartrate of Quinia and Morphia is a sedative, tonic, and febrifuge, and is useful in all febrile diseases, especially where there is great irritability or excitability of the nervous system, restlessness, watchfulness, etc.; also in delirium tremens, periodic spasmodic diseases, epilepsy, and wherever a sedative tonic effect is desired. The dose is from a fourth of a grain to a grain, every one, two or four hours, as the urgency of the case may require.

QUINIÆ ET SALICINIÆ TARTRAS. *Tartrate of Quinia and Salicin.*

Preparation.—Take of pure Salicin *four hundred and fifty-seven grains;* Tartaric Acid, crystallized and dried, *one hundred and fifty-six grains;* pure Quinia *one hundred and sixty-two grains;* Water *a sufficient quantity.* Add the Alkaloids to the Water, and boil together, until they are dissolved. Evaporate the solution at a low temperature, till it is of the consistence of thick syrup; then spread it in layers on glass or porcelain plates, and dry in the shade.—*J. M. Sanders.*

History.—This non-crystallizable, double-alkaloidal salt is, like the previous salt, obtained in scales or pellicles, inodorous, bitter, and possessing in a high degree the activity of both its constituent alkaloids. It is soluble in water.

Properties and Uses.—Tartrate of Quinia and Salicin is a febrifuge, tonic, and antiperiodic. It possesses an activity which does not belong to its isolated salts, and may be used in all those cases where either quinia or salicin would be indicated. The dose is from one to five grains, every one, two, or four hours.

N. B. The corresponding *citrates* of the above salts, as well as the *Ferrocitrates of Quinia, Morphia,* and *Salicin,* may be prepared by substituting citric acid for the tartaric, and which may be substituted for the corresponding tartrates, if desired, in the same doses, and forms of disease.

QUINIÆ VALERIANAS. *Valerianate of Quinia.*

Preparation.—Take of Muriate of Quinia *seven drachms* (Dublin weight); Valerianate of Soda *one hundred and twenty-four grains;* Distilled Water *sixteen fluidounces.* Dissolve the Valerianate of Soda in two ounces of the Water, and the Muriate of Quinia in the remainder, and, the temperature of each solution being raised to 120°, but not higher, let them be mixed, and let the mixture be set by for twenty-four hours, when the Valerianate of Quinia will have become a mass of silky acicular crystals. Let these be pressed between folds of blotting-paper, and dried without the application of artificial heat.—*Dub.*

History.—In this process a double decomposition takes place between the two salts, producing a solution of chloride of sodium, and crystals of Valerianate of Quinia. This salt may also be made by either of the following methods: Add a slight excess of Valerianic Acid to a Concentrated Solution of Quinia, in strong Alcohol; dilute the solution with twice its weight of Water, stir the mixture accurately, and evaporate at a temperature not exceeding 122° F. After the evaporation of the Alcohol, the Valerianate appears in fine crystals, sometimes isolated, at others grouped together, and which increase from day to day. Or it may be procured by double decomposition of Sulphate of Quinia and Valerianate of Lime, each dissolved in weak Alcohol, and then evaporated.

Wittstein directs one part of pure valerianic acid (the terhydrate) to be dissolved in a flask with 180 parts of water; three parts of recently prepared and moist quinia is to be added, the mixture heated nearly to boiling, filtered while hot, and the filtrate set aside for a few days to crystallize. After which the crystals are to be separated from the mother-liquor, the latter evaporated but at a temperature under 120° F., and the salt dried with a very gentle heat.

Valerianate of Quinia crystallizes in colorless rhombohedral tables of a mother-of-pearl-like luster, or else in stellated groups of opaque needles, with a repulsive, valerianic acid odor, and a bitter taste afterward reminding one of valerian. Warmed it becomes tough, readily fuses to a colorless liquid, and giving off water is converted into a hydrate. Heated more strongly it gives off white vapors, ignites, and burns without leaving a residue. It dissolves in 110 parts of cold, and 40 parts of boiling water; in 6 parts of cold, and in an equal weight of boiling alcohol of sp. gr. 0.863; in ether it is readily soluble. All the solutions have a neutral reaction.—*Witt.* Its formula is $2C_{20}H_{12}NO_2 + C_{10}H_9O_3 + 4HO + 20$ Aq. $= \overset{+}{Q}_2 Va + 4HO + 20$ Aq. A spurious valerianate has been met with, made by adding a few drops of oil of valerian to disulphate of quinia. This dissolves in about 30 parts of boiling water, depositing crystals of the disulphate on cooling. A thin film of oil will be seen on the surface of the water.

Properties and Uses.—Valerianate of Quinia is tonic, febrifuge, and sedative, and may be employed similarly with the tartrate of quinia and morphia. It was highly recommended by the late Prof. I. G. Jones in hemicrania, and in febrile or other diseases, to relieve restlessness, wakefulness, nervous irritability. The dose is from half a grain to two grains, every or two, three, or four hours, according to the nature of the case.

Off. Prep.—Pilulæ Cimicifugæ Compositæ.

SODA.

Salts of Soda.

SODÆ BICARBONAS. *Bicarbonate of Soda.*

Preparation.—"Fill a glass jar with fragments of marble, the jar being open at the bottom and tubulated at the top; close the bottom in such a way as to keep in the marble without preventing the free passage of a fluid; connect the tubulature closely, by a bent tube and corks, with an empty bottle, and this in like manner with another bottle filled with one part of Carbonate of Soda, and two parts of Dried Carbonate of Soda, well triturated together; and let the tube be long enough to reach the bottom of the bottle. Before closing the last cork closely, immerse the jar to the top in diluted muriatic acid contained in any convenient vessel; when the whole apparatus is thus filled with carbonic acid gas, secure the last cork tightly, and let the action go on till next morning, or till gas is no longer absorbed by the salt. Remove the damp salt which is formed, and dry it, either in the air without heat, or at a temperature not above 120° F."—*Ed.*

In this process, monocarbonate of soda is exposed to the action of carbonic acid gas; the gas is rapidly absorbed under development of heat, and the soda becomes moist, owing to the evolution of part of the water of crystallization. Henry and Guibourt prepare it by dissolving six parts of crystallized carbonate of soda in four parts of water, to this sesquicarbonate of ammonia two parts, are added, heat applied to drive off the ammonia, not over 100° F., and the solution is then set aside to crystallize. There are several other methods of preparing this salt, which it is unnecessary to relate here.

Bicarbonate of Soda, according to its mode of preparation, is in small, white, opaque, irregular scales, or in minute, colorless, indistinct crystals, or, when prepared by the above formula, in white, aggregated masses of granules, opaque and of a crystalline character. It is permanent in the air, and possesses a saline, feebly alkaline, not unpleasant taste. It is soluble in thirteen parts of temperate water, and in much less at 212°, from the latter of which it is obtained in minute, hard, white grains, composed of radiated fibers, as it slowly cools. When its solution is heated a little above 120°, carbonic acid gradually passes off from the salt, which becomes converted into sesquicarbonate at 212°. At a red heat it is converted into an anhydrous carbonate, its water of crystallization, and an equivalent of carbonic acid being expelled. Bicarbonate of Soda consists of one equivalent of soda 31.3, two of acid 44.24, and one of water $9 = 84.54$.—*C.* Its formula is $NaO\,2\,CO_2\,HO$; its equivalent weight 84.

Bicarbonate of Soda is seldom adulterated, its principal impurity being the result of faulty preparation; in consequence of which, probably arising from imperfect saturation with carbonic acid, a greater or less proportion of carbonate of soda is found with it. The presence of the carbonate may be known by the decided alkaline and disagreeable taste imparted; by the solution giving a white precipitate with sulphate of magnesia; and by a solution in forty parts of water, giving a reddish-brown precipitate with corrosive sublimate, even if only one per cent. of the carbonate be present—this test causes a slight milkiness only with the pure bicarbonate.—*C.* When quite pure, a moderately dilute solution of bicarbonate of potassa, occasions no precipitate with bichloride of platinum, perchloric acid, or tartaric acid, by which its freedom from potassa is demonstrated. When supersaturated with pure nitric acid, it gives no precipitate with either chloride of barium or nitrate of silver, when sulphates and chlorides are absent. Bicarbonate of Soda may be distinguished from the monocarbonate, by its not reddening turmeric, by its not producing a red precipitate with corrosive sublimate, nor a white one with the sulphate of magnesia of the shops, and by the quantity of carbonic acid gas it evolves on the addition of sulphuric acid.—*P.*

Bicarbonate of soda is *incompatible* with acids, acidulous salts, lime-water, muriate of ammonia, and earthy and metallic salts. Sulphate of magnesia does not decompose it.

Properties and Uses.—Bicarbonate of Soda possesses properties similar to the bicarbonate of potassa, though less actively diuretic; it also resembles the carbonate of soda in its action, but is much less irritating, and milder to the taste. It is an excellent antacid and antilithic; and has been used in urinary diseases attended with uric acid formations; but its use should not be continued too long after the removal of these formations, else deposits of the phosphates will occur. The bicarbonate is, however, less apt to produce this result than the carbonate of soda, more especially when it is administered in carbonic acid water. The dose of Bicarbonate of Soda is from five to forty grains in a glass of common soda or carbonated water; the dose for children in proportion. *Soda Powders*, or *Effervescing Powders* are prepared by placing in one paper Tartaric Acid twenty-five grains; and in another Bicarbonate of Soda thirty grains. When to be used, they are dissolved in separate portions of water, to which some aromatic syrup may be added, and then mixed. Effervescence immediately ensues, during which the liquid is to be drank. It forms a cooling and slightly laxative draught, which is very agreeable and invigorating, especially to persons with fever. The effervescence is occasioned by the escape of carbonic acid, which is set free from the bicarbonate by the tartaric acid, which unites with the soda, forming a tartrate of soda.

The *Yeast*, or *Baking Powders*, which are now sold so extensively throughout the country, are composed of 54.7 parts of crystallized bitartrate of potassa, in powder; 22.7 parts of soda-salæratus, a salt between the carbonate and bicarbonate, as regards its proportion of carbonic acid; and 22.7 parts of starch, of which corn starch is the best. A good baking powder may be made of two and a half parts of bitartrate of potassa, and one part, each, of Bicarbonate of Soda and starch.

SODÆ CARBONAS EXSICCATUS. *Dried Carbonate of Soda.*

Preparation.—"Take of Carbonate of Soda *a convenient quantity*, heat it in a shallow vessel till it is dry, then heat it to redness in a crucible, and when cold reduce it to a powder."—*Ed.*

History.—Carbonate of Soda consists of one equivalent of base, one of acid, and ten of water; at a moderate heat it fuses in its water of crystallization; and a higher temperature drives off all the water, leaving a white, opaque, anhydrous carbonate. A full red heat fuses the anhydrous salt. The anhydrous carbonate tastes much more alkaline and acrid than the crystals; it is readily pulverized. Its formula is $Na\,O + C\,O_2$; and its equivalent weight 53.3.—*C.*

Properties and Uses.—Dried or Anhydrous Carbonate of Soda possesses properties similar to the crystallized carbonate. It is antacid and antilithic, and is useful in urinary affections with excess of uric acid. It may be given in powder, or in pill, with extracts, soap, etc. The dose is from five grains to a scruple, rather less than the carbonate, on account of its loss of water of crystallization.

Off. Prep.—Sodæ Bicarbonas.

SODÆ ET POTASSÆ TARTRAS. *Tartrate of Potassa and Soda. Tartarized Soda. Rochelle Salt.*

Preparation.—"Take of Bitartrate of Potassa, in powder, *sixteen ounces;* Carbonate of Soda *twelve ounces;* Boiling Water *four pints* (Imp. meas.) Dissolve the Carbonate in the Water, add the Bitartrate to neutralization; boil and filter. Concentrate the liquor till a pellicle forms on its surface, and then set it aside to cool and crystallize. The residual liquor will yield more crystals by further concentration and cooling."—*Ed.*

History.—This salt was first made known in 1672 by Seignette, an apothecary at Rochelle; but the mode of preparing it was not made known until in 1731 by Boulduc and Geoffroy. The soda of the crystallized carbonate, in the above process, neutralizes the second equivalent of acid in the cream of tartar, and the carbonic acid is given off. The tartrate and soda thus formed, gives with the tartrate of potassa which remains, and a portion of water, a very soluble crystallizable double salt, the potassio-tartrate of soda. 2352 parts of cream of tartar require 1790 parts of crystallized soda for their saturation; these relative weights vary according to the state of purity of the cream of tartar, which frequently contains tartrate of lime, while the carbonate of soda may contain sulphate of soda. By crystallization, these foreign salts are removed. If the cream of tartar contains much racemic acid, a considerable loss of crystallized potassio-tartrate of soda will result, and the mixture will contain a large quantity of syrupy mother-liquor; for the racemic acid forms with difficulty a double salt of potassa and soda.

Tartrate of Potassa and Soda forms beautiful, transparent, right-rhombic, six and twelve sided prisms, often of considerable size, and frequently produced in halves. It is odorless, of a mild, saline, cooling taste, and is unalterable in the air at ordinary temperatures; but slightly effloresces when the air is very dry. At a moderate temperature it fuses in its water of crystallization, again becoming solid; if the heat is increased it again fuses with decomposition, leaving a mixture of carbonates of soda, and potassa and charcoal. It is soluble in two and a half parts of cold water, and in scarcely its weight of boiling; the solution has a neutral reaction. Alcohol takes up only traces of it.—*Witt.* Sulphuric acid added to the aqueous solution, causes a precipitate of small crystals of bitartrate of potassa; perchloric acid precipitates perchlorate of potassa; bichloride of platinum gives a yellow precipitate. Chloride of barium, or a weak solution of nitrate of silver, occasion no precipitates unless sulphates or chlorides are present. It is *incompatible* with acetates of lead, soluble baryta, and lime salts, many acids, and salts containing excess of acid. Its formula is $(KO+\bar{T})+(NaO+\bar{T})+8\,HO$; its equivalent is 283.

Properties and Uses.—Tartrate of Potassa and Soda is a mild, laxative, cooling salt, rather more agreeable than most neutral salts, and adapted for irritable or fastidious stomachs. Its dose is from two drachms to an ounce, dissolved in eight or ten parts of water. When given in the form of dilute solution, and so as not to excite purging, it becomes absorbed, and produces alkalinity of the urine; consequently, its use should be avoided in phosphatic urine. Two drachms of Tartrate of Potassa and Soda added to two scruples of Bicarbonate of Soda, and put up in one (blue) paper, and thirty-five grains of Tartaric Acid placed in the other (white) paper, forms the gentle laxative known as *Seidlitz Powder.* Dissolve the contents of each paper, separately, in half a tumbler of water, mix the two solutions, and drink immediately, while it is effervescing. The necessity for using two papers may be obviated, and a very satisfactory preparation obtained, by mixing two parts of bitartrate of soda with one part of bicarbonate of soda; the mixture keeps well even in paper, and effervesces briskly when mixed with water.

SODÆ PHOSPHAS. *Phosphate of Soda.*

Preparation.—"Take of Bones, burnt to whiteness, *ten pounds;* Sulphuric Acid *two pints and four fluidounces*, Imp. meas.; Carbonate of Soda *a sufficiency.* Pulverize the bones, and mix them with the acid; add gradually six pints of boiling water, and strain through strong linen; pass more boiling water through the mass on the filter till it comes away nearly tasteless. Let the impurities subside in the united liquors, pour off the clear fluid, and concentrate to six pints. Let the impurities again settle; and to the clear liquor, which is to be poured off and heated to ebullition, add Carbonate of Soda, previously dissolved in boiling water, until the acid is completely neutralized. Set the solution aside to cool and crystallize. More crystals will be obtained by successively evaporating, adding a little Carbonate of Soda till the liquid exerts a feeble alkaline reaction on reddened litmus-paper, and then allowing it to cool. Preserve the crystals in well closed vessels."—*Ed.*

History.—Bones are composed chiefly of carbonate of lime, gelatin, and phosphate of lime, and when burnt at a full red-heat, the gelatin is decomposed, its carbon becomes gradually consumed, and a white substance called bone-phosphate is left, consisting of phosphate of lime and a small proportion of carbonate, etc. When this bone-phosphate is well pulverized, and subjected to the action of sulphuric acid, the carbonic acid of the lime or bone-phosphate is set free with effervescence, and the carbonate of lime is thus decomposed. The phosphoric acid of the most of the phosphate of lime is also liberated by the action of the sulphuric acid, and all the lime detached from the two salts (the carbonate and phosphate) unites with the sulphuric acid, forming an insoluble sulphate of lime. The liberated phosphoric acid unites with that part of the phosphate of lime which has not been decomposed, and forms with it a solution of the superphosphate of lime. Boiling water is now added for the purpose of cleansing the sulphate of lime from any superphosphate, and then the fluid is strained ; the sulphate, which remains on the strainer, is further washed to free it of all superphosphate, which imparts an acid taste to the water. The washings and strained solution of the superphosphate of lime are now added together, and upon resting for a time until cool, a deposit ensues of sulphate of lime, from which the fluid may be separated by simply pouring it off. By concentrating this fluid more sulphate of lime is precipitated, which is separated as in the former instance. The clear, concentrated solution is now exposed to the boiling point, and a solution of carbonate of soda in boiling water added until the acid character of the solution of superphosphate is neutralized. The carbonic acid is set free, and the soda is converted into a tribasic Phosphate of Soda by its combination with the surplus phosphoric acid of the solution, while the neutral phosphate of lime is deposited. The solution of the tribasic phosphate is separated from the lime salt by filtration, and by concentration and cooling, the crystals form.

Wittstein says that for analytical purposes, it is better to add to pure phosphoric acid solution, in a porcelain dish, pure crystallized carbonate of soda as long as it causes an effervescence, and until the acid reaction is exchanged for an alkaline one. Seven parts of acid, sp. gr. 1.160, requires six parts of soda. It is placed in the cool to crystallize, the crystals separated, spread on filtering-paper to dry, and kept in a cool place. The mother-liquor, on evaporation, yields fresh quantities of crystals. The product will equal in weight the phosphoric acid used. Phosphate of Soda (basic) crystallizes in colorless, transparent, oblique, rhombic prisms and tables, which are odorless, and of an agreeable, cooling, saline taste, with a feeble alkaline reaction. It effloresces in the air, and much more readily in warm air, becoming opaque. When heated, the crystals undergo the watery fusion, and the dried salt has the formula $2\,NaO+HO+P_2O_5$; if this is heated to redness the basic atom of water is driven off, the salt fusing to a clear mass, which is opaque on cooling. The fused salt is stochiometrically a neutral one, the so-called *pyro-phosphate of soda*; the great difference between which and the ordinary basic Phosphate of Soda, is, that it gives with nitrate of silver a white precipitate ($2\,AgO+P_2\,O_5$), while the latter gives a yellow one ($3\,Ag\,O+P_2O_5$). Phosphate of Soda is soluble in four parts of temperate, and two of boiling water; it is nearly insoluble in alcohol. If on supersaturation with hydrochloric acid, effervescence ensues, it contains carbonate of soda; a yellow precipitate caused by passing sulphureted hydrogen through the hydrochloric acid solution, and which is readily soluble in carbonate of ammonia, indicates arsenious acid, which arises from the employment of either sulphuric acid or phosphorus containing arsenic. If properly prepared, however, the phosphoric acid from the superphosphate of lime can not contain arsenic, as with the basic phosphate of lime the arsenious acid is precipitated as a lime salt. Sulphate of soda is detected in the solution acidified with nitric acid, by nitrate of baryta; chloride of sodium by nitrate of silver; lime is detected by neutral oxalate of potassa, and after separating the lime, ammonia will determine the presence of magnesia. If magnesia is suspected, the lime must not be thrown down by oxalate of ammonia, for the magnesia would immediately precipitate as ammonio-phosphate of magnesia. Hydrosulphate of ammonia must cause no change; a black precipitate with it indicates iron or copper; the former metal will give a bluish precipitate with tannic acid.—*Witt.*

Phosphate of Soda is *incompatible* with magnesia, mineral acids, soluble lime salts, and some solutions of metallic salts. It contains 62.6 parts of soda, 71.4 of phosphoric acid, and 225 of water. Its formula is $2\,NaO\;HOc\,PO_5+24\,HO$; its equivalent weight 359.

If a solution of Phosphate of Soda be evaporated at 90°, the salt crystallizes with only fifteen instead of twenty-five equivalents of water.

Properties and Uses.—Phosphate of Soda, formerly known as *Subphosphate of Soda*, and *Sal Mirabile*, is a mild, saline cathartic, well adapted to febrile and inflammatory diseases, and for children and others whose stomachs are delicate or irritable. The dose is from six to twelve drachms in broth, soup, or Indian-meal gruel.

Off. Prep.—Ferri Phosphas.

SODÆ VALERIANAS. *Valerianate of Soda.*

Preparation.—"Take of Bichromate of Potassa, in powder, *nine ounces;* Fusel Oil *four fluidounces;* Commercial Oil of Vitriol *six fluidounces and a half;* Water *half a gallon;* Solution of Caustic Soda *one pint*, or *as much as is sufficient.* Dilute the Oil of Vitriol with ten fluidounces of Water, and dissolve the Bichromate of Potassa in the remainder of the water, with the aid of heat. When both the solutions have cooled down to nearly the temperature of the atmosphere, place them in a matrass, and having added the Fusel Oil, mix well by repeated shaking until the temperature of the mixture, which at first rises to 150°, has fallen to 80° or 90°. The matrass having been now connected with a condenser, heat is to be applied so as to distill over about half a gallon of liquid. Let this, when exactly saturated with Solution of Caustic Soda, be separated from a little oil that floats upon its surface, and evaporated down until the escape of aqueous vapor having entirely ceased, the residual salt is partially liquefied. Now withdraw the heat, and when the Valerianate of Soda has concreted it is, while still warm, to be divided into fragments, and preserved in a well-stopped bottle."—*Dub.*

History.—The above weights are Avoirdupois, and the measures are Imperial, according to the Dublin College. Fusel oil when oxidized so as to lose two equivalents of hydrogen, is transformed into valerianic acid and water. In the above process the oxygen is derived from the chromic acid of the bichromate of potassa. When this salt is acted on by sulphuric acid the products are—oxygen, which is eliminated, water, and potassio-sulphate of chromium. The valerianic acid being volatile, distills over, and is neutralized by caustic soda. The solution of Valerianate of Soda is then to be evaporated to dryness, and the residual salt partially liquefied to obtain it in the anhydrous state.—*P.*

The addition of the mixture of sulphuric acid and fusel oil must be very carefully made and in small quantities, otherwise so powerful a reaction ensues, that without any application of fire, and before the whole of the mixture is in the retort, so much heat is evolved as to cause it to boil. On the first distillate is commonly a thin oily layer, which consists of oxidized fusel oil, or more properly speaking, valerianate of oxide of amyle$=C_{10}H_{11}O+C_{10}H_{9}O_{3}$.—*Witt.* Valerianate of Soda, Na O Va, crystallizes with difficulty, but may be obtained in a cauliflower-like mass. It begins to fuse at 268°, and on cooling forms a white solid mass, which has a greasy or soapy feel. Its odor is like valerianic acid; its taste sweet but nauseous. It is deliquescent, and soluble in alcohol or water.—*P.*

Properties and Uses.—Valerianate of Soda is not used as a medicine, but for the preparation of the valerianates of iron, quinia, etc., by double decomposition of the soda salt with salts of the respective bases. It might be used with advantage in nervous and irritable habits, attended with acidity of the stomach.

Off. Prep.—Quiniæ Valerianas.

STRYCHNIA.

Strychnia.

Preparation.—"Take of Nux Vomica, rasped, or in powder, *one pound;* Water *one gallon and a half;* Commercial Oil of Vitriol *half a fluidounce;*

Slacked Lime *one ounce;* Rectified Spirit *one quart;* Dilute Sulphuric Acid, Solution of Ammonia, of each, *a sufficient quantity;* Prepared Animal Charcoal *half an ounce.* Macerate the Nux Vomica for twenty-four hours with half a gallon of the Water, acidulated with two fluidrachms of the Acid, and, having boiled for half an hour, decant. Boil the residuum with a second half-gallon of the Water, acidulated with one fluidrachm of the Acid; decant, and repeat this process with the remaining Water and Acid, the undissolved matter being finally submitted to strong expression. The decanted and expressed liquors having been passed through a filter, and then evaporated to the consistence of a syrup, let this be boiled with the Rectified Spirit for twenty minutes, the Lime being added in successive portions during the ebullition, until the solution becomes decidedly alkaline. Filter through paper, and having drawn off by distillation the whole of the Spirit, let the residuum be dissolved in the Dilute Sulphuric Acid, and to the resulting liquid, after having been cleared by filtration, add the Solution of Ammonia in slight excess, and let the precipitate which forms be collected upon a paper filter, dried, and then dissolved in a minimum of boiling Rectified Spirit. Into this solution introduce the Animal Charcoal, digest for twenty minutes, then filter, and allow the residual liquor to cool, when the Strychnia will separate in crystals." —*Dub.* The above weights are Avoirdupois, and the measures Imperial.

History.—In this process, the nux vomica must be rasped or reduced to powder, in order that it may be more readily and thoroughly acted upon. By digesting this powder in water acidulated with sulphuric acid, the sulphates of strychnia and brucia are obtained. Rectified spirit is added to these infusions, when filtered and concentrated, for the purpose of keeping the strychnia in a soluble condition, while the lime decomposes the sulphates, and, by uniting with their sulphuric acid, forms sulphate of lime. The solution is again freed from foreign matters by filtration, the rectified spirit removed by distillation, and sulphuric acid added to the residue; the sulphates of brucia and strychnia formed are decomposed by ammonia, the precipitated strychnia is dissolved in boiling spirit, treated with animal charcoal to decolorize it, and then allowed to crystallize in a cool place. The strychnia is deposited in crystals, the brucia remains in solution. As brucia, to some extent, remains with the strychnia, the latter should be purified by two or three solutions in boiling alcohol, and subsequent crystallizations. For a mode of preparing strychnia without alcohol, by J. Horsley, see *Am. Jour. Pharm.*, *XXVIII.*, 553, also Thwaite's and Herapath's patent for ditto, *Am. Jour. Pharm.*, *XXVI.*, 455.

Strychnia crystallizes in elongated, oblique, colorless octaedres, or four-sided pointed prisms, which are odorless, and of an insupportably bitter taste, so intense as to be communicated to water containing only an 80,000 th part of it. In the air, at the ordinary temperature, or at a gentle heat, it undergoes no change; but strongly heated it fuses to a pale-yellow liquid, gives off white vapors, becomes brown, and burns with a clear flame, leaving a carbonaceous residue, which is entirely consumed by continued heating. Water at 50° dissolves only about one six thousandth part of it ($\frac{1}{6667}$th *P.*), and one twenty-five hundredth at 212°. Alcohol of 80 pr. ct. dissolves at 60° only the one hundred and twentieth part of it, and at 212°, one tenth of it. It is moderately soluble in fixed and volatile oils; and insoluble in caustic alkalies and ether. One part of strychnia is soluble in about 1000 parts of bisulphuret of carbon, 350 of ether, 250 of benzole, 100 of alcohol, 30 of Dutch oil, and in ten parts of chloroform; hence, this last is its best solvent. Tartar emetic greatly increases the solubility of strychnia in water. It forms salts with acids, which are generally crystallizable; and it is alkaline in its reactions. Its formula according to Regnault, in the anhydrous state is $C_{42} H_{22} N_2 O_4 = \overset{+}{\mathrm{Sr}}$; its equivalent weight is 334. Liebig and Gerhardt define its composition to be $C_{44} H_{24} O_4 N_2$.

The tests for strychnia are the following: Chlorine water dissolves strychnia, but not completely; ammonia added to the solution causes a dense, white flocculent precipitate, which, on standing, acquires a rose color. Strychnia is alkaline, combustible, intensely bitter, insoluble to any extent in water, ether, or alcohol, and soluble in dilute acids. Pure strychnia is unchanged by nitric acid in the cold, and gives on heating a greenish-yellow color, which yields a white turbidness on the addition of protochloride of tin. Owing to the presence of brucia and yellow coloring matter, commercial strychnia forms a red liquid with nitric acid, which afterward becomes yellow—if this red liquid be concentrated and then potassa be added, an orange precipitate ensues, which dissolves in an excess of water. Strychnia dissolved in acetic acid, is freely precipitated by each of the following agents; the 1000th part of a grain of strychnia may be placed on a slip of glass, then dissolved in a small drop of acetic acid, and finally touched with a little of the reagent previously dissolved in water,—bichloride of mercury occasions a white precipitate, which is composed of plumose tufts and acicular radiating crystals. Chloride of platinum and chloride of gold will produce pale yellow crystals, which first appear as small nodules made up of myriads of minute particles; these soon give place to short prisms arranged in circular groups, or to long, needle-like prisms radiating from a center; here and there the prisms are so large as to look like thin rectangular tables. Carbazotic acid will occasion a pale-yellow precipitate of very delicate needles, arranged in tufts or in radii; or else as feathery crystals much serrated at the edges. Iodide of potassium will produce a rich amber-yellow or reddish-brown precipitate, composed of minute prisms, grouped in rosettes and in macles. Chloride of iron, perchloric acid, iodine, tannic acid, tincture of galls, ammonia, potassa, soda, and their carbonates, each, produces a precipitate.

When strychnia is brought under the influence of nascent oxygen, it instantly acquires a deep rich blue color, which speedily passes into purple, violet, crimson, orange, and yellow. Any thing which gives out oxygen when mixed with sulphuric acid has the power of striking the characteristic tints with strychnia; hence it is that iodic acid, iodate of potassa, peroxide of barium, red prussiate of potassa, and even the positive pole of a galvanic battery, will develop the tints. As one experiment, place the strychnia on a clean white plate, then touch it with a small drop of concentrated sulphuric acid; stir it about with a glass rod, so as to mix the strychnia very perfectly with the acid; allow it to remain in this state for a few minutes, and, if the strychnia be pure, there will be no discoloration. Then cautiously add the reagent—namely, the bichromate of potassa, peroxide of lead, or peroxide of manganese—taking care not to add too much of it; in fact it is best done by dropping the powder into the oil of vitriol and strychnia from the point of a pen-knife. Lastly, either incline the plate so that acid may gently flow over the powder, or else stir the powder about with the point of a rod. The violet color will be observed.

The galvanic test is as follows: Place a drop of a solution of strychnia (say one part in 10 or 20,000 parts of water) into a slight cup-shaped depression made in a piece of platinum foil. Allow the fluid to evaporate, and when dry moisten the spot with a little concentrated sulphuric acid. Connect the foil with a positive pole of a single cell of Grove's or Smee's battery, and then touch the acid with the platinum terminal of the negative pole. In an instant the violet color will flash out, and on removing the pole from the acid, the tint will remain.

Dr. Marshall Hall's physiological test is as follows: The thousandth of a grain of strychnia dissolved by the aid of a little acid in a drop or two of water, and injected into the abdominal cavity of a frog, will speedily produce the tetanic effects which are so characteristic of the poison; and the same quantity dropped into its mouth will also act after the lapse of half an hour or more. The above is by Dr. H. Letherby of London, and is extracted from No. 34, 1857, p. 313, of Braithwaite's Retrospect, to which number of that journal the reader is referred for much interesting matter on this subject.

Rodgers and Girdwood give the following method of detecting strychnia in the blood, urine, various tissues and organs of the body: The part of the body to be operated upon is digested with dilute hydrochloric acid, one to ten, until it is apparently fluid: the liquid is then filtered and evaporated to dryness over a water-bath, treated with alcohol as long as any thing is dissolved, and this tincture is filtered and evaporated as before, and the residue treated with water and filtered; this aqueous solution must now be rendered alkaline by ammonia, and agitated in a long bottle or tube, with about half an ounce of chloroform; after subsidence, the chloroform is drawn off by means of a pipette, transferred to an evaporating basin, and the chloroform evaporated over a water-bath; the residue must then be moistened with concentrated sulphuric acid, and exposed for some hours to the temperature of a water-bath, by which proceeding all organic matter except the strychnia is destroyed. The charred mass is then treated with water, and the solution filtered to separate the carbon; excess of ammonia is now added, and the solution again agitated with about one drachm of chloroform; if on evaporating a small portion of this chloroform solution, and treating the residue with concentrated sulphuric acid, any charring takes place, the preceding process must be repeated, when the last chloroform solution will afford the strychnia sufficiently pure for conclusive testing. For this purpose a small quantity is taken up in a capillary tube, and allowed to evaporate on the smallest spot possible of a warm porcelain capsule, by adding successive drops until the whole is evaporated on the spot. If the quantity is large, say from $\frac{1}{2000}$th of a grain to a larger quantity, moisten the spot, when the capsule is quite cold, with concentrated sulphuric acid, and then adding a minute fragment of bichromate of potassa. If, however, the quantity is very small, no color will be perceived by this mode of testing, then the sulphuric acid rendered slightly yellow by chromic acid, will be found useful. For much valuable matter in relation to strychnia see *Am. Jour. Pharm., XXVI.*, 471; *XXVIII.*, 257 and 458; *XXIX.*, 267 and 355.

Strychnia is liable to adulterations. Brucia is best detected by the red color it imparts to dilute nitric acid, becoming yellow on warming; protochloride of tin then causes a purple-violet color and precipitate. Lime, magnesia, and other mineral powders, are left behind on boiling with alcohol or chloroform, or heating to redness.

BRUCIA.—$C_{44} H_{25} N_2 O_7$ Liebig; or $C_{46} H_{26} N_2 O_8 = \overset{+}{B}_2$, Regnault; equivalent weight 373 or 394, was discovered by Pelletier and Caventou in 1819. It exists in the bark and seeds of nux vomica, and in St. Ignatius' bean. It is usually obtained from false angustura bark, by digesting the bark in water, adding oxalic acid to the decoctions, evaporating the liquid to the consistence of an extract, and digesting this extract in alcohol at 32°; oxalate of Brucia remains; decompose this by boiling with magnesia and water, then dissolving the Brucia in boiling alcohol, and obtaining in crystals as the solution cools.—*Thenard.*

Brucia slowly crystallizes in colorless, transparent, oblique, four-sided prisms, or by rapid evaporation in pearly scales. It is odorless, intensely and persistently bitter, unalterable in the air, and fusible a little above 212° F. It is soluble in alcohol, in 850 parts of cold water, and 500 parts of boiling, sparingly soluble in volatile oils, and insoluble in ether and the fixed oils.—*P.*—*C.*

In chlorine water the Brucia entirely dissolves, being decomposed, assuming a rose color, which ammonia converts to a dirty yellow. Nitric acid dissolves it, also with decomposition, forming a deep rose color, which on warming becomes yellow, and if protochloride of tin is now added a purple-violet color and precipitate is formed. The presence of strychnia is known when the alkaloid dissolved in alcohol is treated with an alcoholic solution of indigotic acid, and to the yellow precipitate, after subsidence and decantation, is added acetic acid. If entirely soluble in this menstruum, the Brucia is free from strychnia, but a residue denotes strychnia.—*Witt.*

When strychnia is dissolved in a solution of bichromate of potassa, it forms a chromate of strychnia, which when touched with a glass rod dipped in sulphuric acid, becomes changed to a deep purple, and then to a violet and red. Chromate of Brucia, similarly prepared and acted on, shows only an orange-red color; the latter salt is also more soluble than the former. Dr. Fuss considers Brucia to be a compound of strychnia and a yellow resin, and Prof. Erdmann, has confirmed his statements.

The *Citrate of Strychnia* may be made by dissolving with a gentle heat in a sufficient quantity of distilled water, one hundred and ninety-two grains of dried citric acid, and then adding three hundred and forty-six grains of pure strychnia. By gentle evaporation the citrate may be obtained in crystals. It is an acid salt, and its constitution is $(C_{12} H_5 O_{11}+H_2)+(C_{44} H_{22} N_2 O_4)$. That is, one equivalent of the strychnia has displaced one equivalent of the external hydrogen of the citric acid. As it is a tribasic acid, there are still two equivalents of external hydrogen to be displaced, ere the acid be entirely neutralized. The dose is from one-tenth to one-twentieth of a grain, to be given cautiously till the desired effect is produced.

The *Tartrate of Strychnia* may be obtained by dissolving a sufficient quantity of distilled water, one hundred and fifty-six grains of tartaric acid, and then adding three hundred and forty-six grains of strychnia, and evaporating as above. It is also an acid salt with the composition indicated by the formula $(C_8 H_4 O_{10}+H)+(C_{44} H_{22} N_2 O_4)$. The dose is the same as the citrate.

Properties and Uses.—Nux vomica and strychnia act chiefly, if not solely, by stimulating the spinal chord and medulla oblongata, and without affecting the functions of the brain. The slightest observable effects from small doses are twitches of the muscles of the arms and legs, occurring especially during sleep, accompanied with restlessness, some anxiety, acceleration of the pulse, and generally slight perspiration. Sometimes the action of the bowels is increased, and the discharge of urine is either augmented, or discharged more frequently; it likewise promotes the venereal appetite. Large doses occasion very violent starting of the muscles; even a tendency to lockjaw, succeeded by stiffnesss, weariness, pain or rending in the limbs. In their highest degree, these effects amount to violent tetanic spasms, occurring in frequent fits, with brief intervals of repose, acute sensibility, and dreadful alarm. Through whatever form or texture strychnia is introduced into the body, it exerts this action more or less, operating with an energy proportioned to the activity of absorption where it is applied. It is not a cumulative poison like mercury or digitalis; nor does its activity diminish under the influence of habit, as with opium. There is no known antidote for it; morphia is probably the best, as full opiate doses will somewhat arrest these effects. Camphor and sweet oil, have been advised as antidotes, but further investigations are required before they can confidently be relied upon. M. Duclos states that under the influence of positive electricity the symptoms of poisoning by strychnia increase, while they lessen or cease altogether when negative electricity is applied. As some patients are powerfully affected by the smallest doses of this agent, too much caution can not be employed in its administration. I would observe here, that a short time since, a favorite Newfoundland bitch, with three pups about two months old, were poisoned by some evil-minded person, by strychnia placed on meat. One of the pups died in the convulsed condition common to the influence of strychnia; the others were attacked with spasmodic twitchings which continued to increase. From some cause the bitch vomited up her meat, a portion of which was eaten by two chickens about six or eight weeks old. To the bitch and the remaining two pups I gave about a gill of sweet oil to each, followed by about four grains of camphor to the mother, and two grains to the pups, in some bread; they recovered and are doing well. Of the chickens, one was apparently dying, lying on the ground, wings outspread, mouth open, and with frequent spasmodic jerks, the other trembled and spasmodically staggered around like an intoxicated person; to each of these I gave about a grain of camphor in butter, and fastened them up, and in an hour they had both fully recovered. I mention these facts that further inquiries may be made as regards the antidotal power of camphor in poisoning by strychnia. To determine whether strychnia was the poison administered, the meat vomited by the dogs was carefully examined. Both dogs and chickens were actively purged.

The alcoholic extract of nux vomica and strychnia are more generally employed in medicine; and the action of the former is owing to the strychnia it contains. Strychnia is used in hemiplegia, paraplegia, partial paralysis of particular joints or muscles, and of the bladder. The paralyzed muscles are always first affected, if they are thrown into spasms at all. If the remedy is to succeed, improvement begins speedily. It must not be used in recent cases of palsy, or while general reaction prevails; neither when signs exist either of local irritation in the brain or spinal chord, or of determination of blood to the head. It has been likewise used in neuralgia, epilepsy, ague, amenorrhea, dysentery, rheumatism, syphilitic osteocopia, and obstinate constipation. In the treatment of gleet, urethral stricture, and recent enlargement of the prostate, I have found it a superior remedy, used internally and locally. In dyspepsia, where there is a want of appetite, constipation, and a sensation of epigastric weight after eating, I have found the combination of one grain of the alcoholic extract of nux vomica, well triturated with forty grains of ptelein, and divided into twenty pills, an excellent remedy; likewise in dyspepsia connected with impotence, caused by masturbation or venereal excesses; the dose is one pill, repeated three times a day. Strychnia will also be found advantageous in many uterine diseases, prolapsus uteri, etc. The dose of strychnia is from one-twentieth of a grain to one-tenth, two or three times a day; it may be rendered more soluble in alcohol or water, by the addition of a few drops of an acid, as the acetic, muriatic, nitric, or sulphuric. Its best form of administration is that of pill. Prof. A. J. Howe has found the following powder to produce an anodyne influence in cases of cancer of the uterus and other severe diseases, attended with extreme pains: take of sulphate of morphia five grains, sulphate of quinia ten grains, strychnia one grain, liquorice powder twenty grains; mix thoroughly together, and divide into twenty powders—one of which may be taken every four or six hours, according to the urgency of the symptoms. *Brucia* exerts an influence upon the system very similar to that occasioned by strychnia, but is less energetic; its dose is from one-eighth of a grain to half a grain, three or four times a day. In the administration of brucia and strychnia, or any of their salts, great caution must be observed, and the patient carefully watched during its use.

Off. Prep.—Pilulæ Eupurpurini Compositæ.

SYRUPI.

Syrups.

Syrups are liquid officinal medicines, of a viscid consistence, produced by the concentrated solution of sugar alone, or sugar mixed with honey, in water, wine, or vinegar. Syrups are either simple or medicated; simple syrup is where the solution of the sugar is made with water only; it forms the basis of a great many medicated syrups.

Medicated syrups are those in which one or more medical agents enter into the solution, and are commonly prepared by incorporating sugar with vegetable, aqueous or spirituous solutions, expressed juices, etc. When the active principles of the ingredients used are dissipated or decomposed by boiling water, or where they are not readily taken up by water, they are frequently dissolved by alcohol, sp. gr. 0.935, the alcohol being retained or evaporated subsequently, as may be required; sometimes a tincture of the medicinal agent or agents is added to simple syrup, and the alcohol removed by gentle heat or spontaneous evaporation. The stability of a syrup depends mainly on its composition and consistence, the temperature, and the amount of its exposure to the air; and no ingredients should be admitted into its composition except the active principle required and simple syrup. As most syrups are used in chronic diseases during the absence of febrile or active inflammatory symptoms, the addition of the alcoholic tincture is not objectionable, unless it be in large proportion; but syrups prepared for febrile or inflammatory difficulties should be entirely free from any spirituous liquor whatever.

The best and most economical plan in making syrups, is to employ only refined sugar, as it saves the trouble of subsequent clarification, beside being less liable to undergo change. The quantity of sugar required, by weight, is double that of liquid; if it be in too small proportion, the syrup will be apt to ferment; if in too large, crystals of sugar will be deposited. The heat employed should be adapted to the character of the active principle; if it be volatile, a gentle heat is required, as well as in cases where a high temperature would decompose it. If it be not injured by heat, concentration should be conducted with a brisk fire, and effected as rapidly as possible, as in many instances a long continued heat will impair its efficiency. The proper degree of concentration is 30° Baumé's saccharometer, when boiling, and 35° when cold; or specific gravity when boiling 1.264, and when cold about 1.321. After the syrup has cooled, if a pellicle forms upon its surface, it has been concentrated too much. Syrups which contain no volatile principle, or one not injured by heat, may frequently be returned to their original character, after having undergone vinous fermentation, by again boiling them to expel the alcohol and carbonic acid, and properly concentrating them; and a syrup thus recovered is less apt to meet with subsequent change, on account of the fermenting principles having been decreased or disorganized. Various means have been devised for the preservation of syrups; a little sulphate of potassa, chlorate of potassa, or sugar of milk, have been recommended for this purpose. One fluidrachm of Hoffman's Anodyne to the pint of syrup will effectually check a tendency to fermentation. The maintenance of a syrup in a regular degree of temperature, say 55° to 60°; will tend very much to lessen its liability to ferment. As a general rule, syrups intended to be kept should be bottled while hot, securely corked and sealed, and after cooling should be shaken that the moisture condensed on the cork may be mixed with the syrup, and not form a diluted layer at the surface. —*Mohr and Redwood.*

The syrups of medicinal plants, etc., which have been prepared according to the method of W. S. Merrell, are found to keep for a long time without undergoing change; in relation to which he has furnished the following remarks:—Most of the medical syrups should be prepared on the same principles as the fluid extracts, only they are less concentrated, and therefore proportionally less. Alcohol should not be retained in their composition, for, as they are administered in larger doses, the presence of spirit in them would be more appreciable and injurious.

Nearly all the compounds that have been proposed for syrups, such as the Alterative, Scrofulous, Stillingia, and Pulmonary syrups comprise substances whose medical principles are imperfectly soluble in water, and should, therefore be acted on by alcohol. I make these preparations with the same apparatus, and by the same process as I make the fluid extracts, thus retaining most perfectly all the aroma and volatile essences of the ingredients. Physicians and apothecaries who have not such apparatus may substitute the process laid down under the formula for Alterative Syrup, *which see.*[*]

In all these preparations, the principle should be adopted of confining the boiling and evaporation to the weaker portion of the solution, so that those delicate principles which are evaporated or decomposed by heat may be submitted to its action as little as possible.[†]

SYRUPUS (SYRUPUS SIMPLEX). *Syrup* (*Simple Syrup*).

Preparation.—"Take of Refined Sugar, in powder, *five pounds* (Avoir.); Distilled Water *two pints* (Imp. meas.); Dissolve the Sugar in the Water with

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[*] Four things, however, must be attended to in making syrups according to Mr. Merrell's plan, viz.: 1. That the active constituents of the articles really require both water and alcohol for their solution; 2. That the active principles taken up by one solvent be not precipitated when the other solvent is added; 3. That the application of heat does not destroy or decompose the medicinal principles; and 4. That such solvent be employed as will take up the least inert vegetable matters.—*K.*

[†] Recently there have been introduced to the profession certain syrups which have been highly recommended in phthisis and tuberculous affections. They may be very excellent medicines, but, as yet, I have seen no decided results from their use, and consider them as of more benefit to the manufacturing chemists than to patients. As some may wish to prepare and test them, I give the formulæ for preparing them:

Syrup of Hypophosphite of Lime.—Dissolve Hypophosphite of Lime *an ounce* in Water *nine and a half fluidounces;* filter, add White Sugar *twelve ounces;* dissolve by aid of heat, and add Fluid Extract of Vanilla *half a fluidounce.* The dose varies from a teaspoonful to a tablespoonful three times a day. A teaspoonful is equivalent to 3½ grains of the lime-salt.

Compound Syrup of Hypophosphites.—Place into a large mortar Hypophosphite of Lime 256 *grains*; Hypophosphite of Soda 192 *grains;* and Hypophosphite of Potassa 128 *grains;* add to them Hypophosphorous Acid (solution, q. s.,) or 240 *grains;* mix, then add moist Hypophosphite of Iron 96 *grains*, and triturate until a uniform smooth mixture results. Now pour in Boiling Water *four fluidounces;* and, after trituration, decant the clear liquid from the undissolved portion to a filter, and add more Boiling Water until it is dissolved, and the filtered liquid amounts to eight fluidounces. To this solution, while still warm, add the Syrup of Vanilla, *previously acidulated* with a few drops of solution of hypophosphorous acid and mix. Each teaspoonful of this syrup contains 2 grains of the lime-salt, 1½ grains of the soda salt, 1 grain of the potash salt, and ¾ grain of the iron salt, with a little free hypophosphorous acid.

Prof. W. Procter, jr., makes the following remarks on the Hypophosphites:

"The recent researches of Dr. Churchill into the therapeutic character and value of the hypophosphites in tuberculosis, some account of which will be found at page 143 of this number, have attracted much attention from physicians, and many inquiries have been made after these salts; and it is believed that a notice of the processes for preparing them, and some formula for their prescription will be acceptable to the readers of the Journal, especially as from their hitherto unimportant position among pharmaceutical chemicals, no mention is made of them in works most accessible. The salts which have been used are those of lime, soda, potassa, and ammonia. In the sequel a notice is given of these, of the hypophosphite of sesquioxide of iron, and of hypophosphorous acid.

The hypophosphites, according to Gmelin, are mostly crystallizable. They can not exist without a certain proportion of water, which is equally true of the acid itself, the aid of a steam or water heat. The sp. gr. of this syrup is 1.330."—*Dub.*

History.—Simple Syrup, when properly made, is quite sweet, nearly odorless, transparent and colorless, of the consistence of molasses, and having the specific gravity 1.321, or 35° Baumé's thermometer. Refined sugar should always be used, else the syrup is apt to become turbid. If necessary, it is easily clarified, by beating to a froth the white of an egg with three or four ounces of water, mixing it with the syrup, and boiling the mixture for a few seconds, until the albumen coagulates, and enveloping all heterogeneous matters, it forms a scum, which may be easily taken off, or separated by filtration.—*Coxe.*—*Dunc.*

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which, in its most concentrated form, contains three equivalents of water, one of which is replacable by bases. When heated till decomposed, these salts emit phosphureted hydrogen. They are permanent in the air as regards oxidation; but when heated in solution, especially if free alkali is present, they are decomposed into phosphates and hydrogen gas. They are nearly all soluble in water, and several of them in alcohol, and readily reduce the soluble salts of silver and gold.

Hypophosphite of Lime is the most important of these salts, as it not only, by oxidation in the economy, will afford phosphate of lime in the nascent state, if needed, but its reactions with the carbonates of the alkalies give a ready means of obtaining the alkaline hypophosphites. When phosphorus is boiled with milk of lime it gradually disappears, with evolution of spontaneously-inflammable phosphureted hydrogen, which explodes as it reaches the atmosphere with the formation of water and phosphoric acid. When the strong odor of phosphureted hydrogen ceases to be given off, the liquid contains, beside the excess of lime, nearly half of the phosphorus as phosphate of lime, and the remainder, deducting the considerable portion which has escaped into the air as phosphureted hydrogen, as hypophosphite of lime. According to Wurtz, more than one equivalent of water is decomposed, and the phosphureted hydrogen is accompanied by free hydrogen. If this be true, the source of the super oxidation of so much of the phosphorus is traceable to the resulting oxygen; but Rose is of the opinion that this oxygen is derived from the atmospheric air in contact with the boiling liquid. When the process is conducted in a flask, it requires a constant ebullition of the liquid to prevent the explosion consequent upon the entrance of the atmospheric air. To avoid this result, it has been found safer to employ a deep, open vessel. The constant evolution of gas and vapor, which keeps a froth on the surface, excludes the atmosphere in a great degree, so that the yield is not much diminished, while the safety and easiness of the process is greatly increased. The process should be conducted under a hood with a strong draught, or in the open air, to avoid the disagreeable fumes which are evolved.

Take of Lime, recently burned	4 lbs. av.
Phosphorus	1 lb. "
Water	5 galls.

Slake the lime with a gallon of the water, put the remainder in a deep boiler, and as soon as it boils, add the slaked lime, and mix to a uniform milk. The phosphorus is now added, and the boiling is kept up constantly, adding hot water from time to time, so as to preserve the measure as nearly as may be, until it is all oxidized and combined, and the strong odor of the gas has disappeared. The mixture froths much, and but little of the phosphorus reaches the surface. Then filter the solution through close muslin, wash out that portion retained by the calcareous residue with water, and evaporate the filtrate till reduced to six pints. The concentrated liquid should now be re-

Properties and Uses.—Simple Syrup is nutritious and demulcent, it is employed in various mixtures, pills, medicated syrups, and extemporaneous prescriptions.

Off. Prep.—Pilulæ Ferri Compositæ; Syrupus Acidi Citrici; Syrupus Ferri Iodidi; Syrupus Ferri Phosphatis; Syrupus Ipecacuanha; Syrupus Tolutanus.

SYRUPUS ACIDI CITRICI. *Syrup of Citric Acid. Lemon Syrup.*

Preparation.—Take of powdered Citric Acid *six drachms;* Refined Sugar *six and a half pounds;* Animal Charcoal *half a pound;* Water *four pints.* Boil the articles together, filter, and add Oil of Lemon *one fluidrachm*, previously rubbed up with a small portion of sugar;

Or, this Syrup may be made by dissolving *a drachm* of Citric Acid in Simple Syrup *a pint*, and flavoring with two or three drops of Oil of Lemon.

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filtered to remove a portion of the carbonate of lime which has resulted from the action of the air on the lime in solution, and again evaporated till a pellicle forms, when it may be crystallized by standing in the drying-room, or the heat may be continued with stirring till the salt granulates, when it should be introduced into bottles.

Hypophosphite of Lime is a white salt, with a pearly, margarin-like luster, and crystallizes in flattened prisms. Its composition, according to Wurtz, is $CaO + 2\ HO\ PO$ the water being essential to the salt. It is soluble in six parts of cold water, and in not much less of boiling water; it is soluble slightly in diluted alcohol, but insoluble in alcohol, sp. gr. .835.

Hypophosphite of Soda is prepared by double decomposition between hypophosphite of lime and crystallized carbonate of soda.

Take of Hypophosphite of Lime	6 oz.
Crystallized Carbonate of Soda	10 oz.
Water a sufficient quantity.	

Dissolve the hypophosphite in four pints of water, and the carbonate in a pint and a half, mix the solutions, pour the mixture on a filter, and lixiviate the precipitate of carbonate of lime, after draining with water, till the filtrate measures six pints. Evaporate this liquid carefully till a pellicle forms, and then stir constantly continuing the heat till it granulates. In this state the salt is pure enough for medical use; but if desired in crystals, treat the granulated salt with alcohol sp. gr. .835, evaporate the solution till syrupy, and set it by in a warm place to crystallize.

Hypophosphite of soda crystallizes in rectangular tables with a pearly luster, is quite soluble in water and in ordinary alcohol, and deliquesces when exposed to the air. Its composition is $NO + 2\ HO\ PO$.

Hypophosphite of Potassa is prepared by the same process as that given above for the soda salt, substituting 5¾ ounces of granulated *carbonate of potassa*, in place of 10 ounces of crystallized carbonate of soda, and using half a pint instead of a pint and a half of water to dissolve it.

Hypophosphite of potassa is a white, opaque, deliquescent salt, very soluble in water and alcohol. Its greater tendency to absorb moisture renders it less eligible for prescription than the soda salt. Its composition is $KO + 2HO\ PO$.

Hypophosphite of Ammonia is prepared from hypophosphite of lime and sulphate or carbonate of ammonia.

Take of Hypophosphite of Lime	6 oz.
Sesquicarbonate of Ammonia (translucent)	7.23 oz.
Water a sufficient quantity.	

History.—This syrup is prepared with less trouble than Lemon Syrup, and can be preserved much better, but its taste is less agreeable. Tartaric acid is sometimes used instead of citric, but the syrup thus made is more apt to spoil, and also to offend the stomach.

Properties and Uses.—This syrup added to water, or to carbonic acid water, forms an agreeable and cooling beverage for persons laboring under febrile complaints, and in certain states of the system. From a fluidrachm to half a fluidounce may be added to half a pint of the fluid in which it is to be taken.

SYRUPUS ALLII. *Syrup of Garlic.*

Preparation.—Take of the recent Bulb of Garlic, bruised, *four ounces;* and macerate them for seven days in Water *fourteen fluidounces ;* Acetic

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Dissolve the lime-salt in four pints of water, and the ammonia salt in two pints of water, mix the solutions, drain the resulting carbonate of lime, and wash out the retained solution with water. The filtrate should then be evaporated carefully to dryness, then dissolved in alcohol, filtered, evaporated and crystallized.

This salt is deliquescent in the air, very soluble in alcohol and water, and when carefully heated evolves ammonia, and leaves hydrated hydrophosphorous acid. The composition of this salt is NH^3+2 HO PO.

Hypophosphite of Sesquioxide of Iron.—This salt may be obtained in the form of a white gelatinous hydrate, by precipitating a solution of hypophosphite of soda or ammonia with one of sesquisulphate of iron. The precipitate should be well washed with water and dried at a moderate temperature. It is necessary to avoid using a hypophosphite containing any alkaline carbonate or the precipitate will be contaminated with free sesquioxide. Thus prepared this salt is a white, amorphous, tasteless powder like the pyrophosphate soluble in hydrochloric acid and in free hypophosphorous acid.

Hypophosphorous Acid.—So far as we are aware, this acid has not been employed, in a free state, by Dr. Churchill, but it is highly probable that it may come into use, should the favorable results claimed for its salts be substantiated by new observations. Any claims which phosphoric acid may possess as an agent to supply the waste of phosphorus and phosphates in the human economy will be more than equaled by this acid. Hypophosphate of baryta is the salt which is most eligible for the preparation of this acid, but it is more convenient to prepare it from the lime-salt, viz.:

Take of Hypophosphite of Lime	480 grains.
Crystallized Oxalic Acid	350 grains.
Distilled Water	9 fluidounces.

Dissolve the hypophosphite of lime in six ounces of the water and the acid in the remainder, with the aid of heat, mix the solutions, pour the mixture on a white paper filter, and when the liquid has passed add distilled water carefully, till it measures ten fluidounces, and evaporate this to 8½ fluidounces.

The solution thus prepared contains about ten per cent. of terhydrated hypophosphorous acid (HO+2 HO PO) a teaspoonful representing 6 grains of the acid, which contains 2¼ grains of phosphorus. The dose of this acid solution will probably vary from ten minims to a teaspoonful.

It is proposed to give several forms in which the hypophosphites may be conveniently administered, and a few hints to the physician in reference to prescribing them.

The soluble salts of mercury and silver are reduced by contact with the hypophosphites. All soluble sulphates and carbonates are incompatible with the lime-salt, and

Acid, sp. gr. 1.04, *two fluidounces;* then express, strain, add White Sugar *two pounds*, and agitate to form a syrup.

Properties and Uses.—This syrup is useful in cough and chronic catarrhal affections of infants, acting also as a mild stimulant to the nerves; to a child under a year old, a fluidrachm may be given for a dose. The active principle of garlic is more readily taken up by vinegar than water. A syrup of onions is often prepared extemporaneously for coughs, by slicing one or two onions, and laying the slices upon each other with sugar between; this is set by the fire in a saucer or glass vessel, and kept there until the juice of the onion and the sugar have, by the aid of the heat, formed a syrup in the vessel. It may be given freely.

SYRUPUS ARALIÆ COMPOSITUS. *Compound Syrup of Aralia.*

Preparation.—Take of the Roots of Small Spikenard, Yellow Dock, Burdock, and ground Guaiacum-wood, each, *ten ounces;* Bark of the Root of Sassafras, of Southern Prickly-Ash, Elder-Flowers, Blue Flag-root, of each, *eight ounces.* 1. Grind and mix the articles together, place the whole four pounds and a half in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for two days. Then transfer the whole to a common displacement apparatus or percolator, and gradually add Hot Water until two pints have been obtained, which retain and set aside. 2. Then continue the percolation, and of the second solution reserve so much as contains a sensible amount of spirit, and distill or evaporate the Alcohol from it. 3. Continue the displacement, by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion till it begins to thicken, or until, when added to the balance remaining of the second portion, after the evaporation of the alcohol, it will make twelve pints. 4. To these two solutions combined, add *sixteen pounds* of Refined Sugar, and, by heat, dissolve—carefully removing the scum which arises as it comes to the point of boiling. Then, if it exceeds that quantity, evaporate the syrup with constant stirring, to fourteen pints, remove from the fire, and when nearly cold, add the two pints of tincture first obtained, and make two gallons of syrup. Each pint will contain the

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should not be associated with it in prescriptions, if phosphate of lime is indicated in the case. The iron-salt when dissolved by excess of acid is colored black by gallotannic acid and drugs containing it, but is not blackened by the tannin of cinchona, catechu and krameria; hence any preparation containing it may be associated with Peruvian-bark. The hypophosphites of soda, potassa and ammonia are more or less deliquescent, and when prescribed in powder it should be with proper precautions to avoid moisture, as by association with a considerable excess of sugar of milk. The lime-salt may be mixed with either this sugar or ordinary sugar. None of these salts are soluble in cod-liver oil; and if given with it, they should be dissolved in syrup, and mixed by agitation. Where lactin and glycerin are indicated in the treatment of phthisis or dyspepsia, any of these salts may be very elegantly associated in the form of syrup."—*Am. Jour. Pharm., 3d series, VI., pp.* 118—122, *and* 227.

virtues of four ounces of the ingredients. It may be flavored with Essence of Wintergreen, Sassafras, or Prickly-Ash Berries, etc.

In the former editions of this work, this preparation was termed "Compound Syrup of Sarsaparilla," *Syrupus Sarsaparillæ Compositus.* On account of the difficulty met with among druggists in filling orders for Compound Syrup of Sarsaparilla, when it is not indicated to them what syrup of this name is required (as there are several), I have deemed it best to change the name that no such difficulty may occur hereafter. This article has also been termed *Alterative Syrup*, but is much superior to the compound formerly known by this name. In the present case I have substituted the roots of Aralia Nudicaulis for the Honduras Sarsaparilla of the former formula, as it is considered by our druggists and physicians to be the more active agent; those, however, who prefer the Honduras Sarsaparilla, will, of course, retain it in their preparation of this syrup.

Properties and Uses.—This forms a valuable syrup, which may be used in all cases where an alterative is indicated; in chronic hepatitis, rheumatism, syphilis, scrofula, cutaneous diseases, ulcers, white swellings, rickets, necrosis, and every taint of the system. Some physicians add an ounce of the iodide of potassium to every pint of syrup. The dose is from a teaspoonful to a tablespoonful, three or four times a day, in about a gill of water.

SYRUPUS ASSAFŒTIDA. *Syrup of Assafetida.*

Preparation.—Take of Assafetida *an ounce;* Boiling Water *a pint;* Sugar *two pounds.* Triturate the Assafetida in a mortar with a portion of the Boiling Water until a uniform paste is formed, then gradually add the remainder of the Water, strain and add the Sugar, dissolving it with a gentle heat.—*R. Petty*, *Am. Jour. Pharm.*, *XXIV.*, 319.

History.—Good assafetida contains nearly six per cent. of volatile oil, which would be dissipated were much heat employed in the solution of the sugar. The object of employing boiling water instead of cold, is to have more of the gum-resin taken up, and which is permanently dissolved or suspended by the sugar. This syrup is nearly white when first made, but gradually assumes a pinkish tinge; it is quite permanent, keeping for several months without any material change, and has the advantage of being entirely free from alcohol, which is often objectionable.

Properties and Uses.—This is an excellent form for the administration of assafetida, being prompt in its action, and not so stimulating as the tincture. The dose is one or two tablespoonfuls, repeated three or four times a day. If used in enema, two to four fluidounces may be injected into the rectum at one time. Other antispasmodics may be combined with it, as fluid extracts of black cohosh, blue cohosh, ladies'-slipper root, scullcap, valerian, etc., according to indications.

SYRUPUS CINNAMOMI. *Syrup of Cinnamon.*

Preparation.—Take of Tincture of Cinnamon *four fluidounces;* Water *three pints;* Refined Sugar *seven pounds and a half;* Essence of Cinnamon (*Tincture of the Oil*) *four fluidrachms.* Mix the Tincture with three pounds of the Sugar in a shallow dish, and evaporate the Alcohol with the aid of a gentle heat, or allow it to evaporate spontaneously; then add the remainder of the Sugar, and dissolve it in two pints and a half of the Water. With the remaining half-pint of Water, beat up the whites of two Eggs, add it to the Syrup, boil for one or two minutes, strain through a Canton-flannel bag, and when nearly cool add the Essence of Cinnamon.

Properties and Uses.—This syrup is a warm aromatic stomachic, carminative, and astringent. It is chiefly used as an adjuvant to other less pleasant medicines, especially in the treatment of diarrhea, dysentery, hemorrhages, and where astringents are indicated. It may be given in doses of one or two fluidrachms.

SYRUPUS COCHLEARIÆ COMPOSITUS. *Compound Syrup of Horseradish.*

Preparation.—Take of the recent Root of Horseradish, grated, *two ounces;* Boneset, Leaves and Tops, *one ounce;* Canada Snakeroot *half an ounce;* Boiling Water, Diluted Acetic Acid, of each, *a sufficient quantity;* Refined Sugar *two pounds.* Infuse the Boneset and Canada Snakeroot in half a pint of the Boiling Water, and express with strong pressure, adding Boiling Water to the mass until half a pint of infusion is obtained; then add the Sugar and dissolve by gentle heat.

Add the Horseradish to Dilute Acetic Acid, half a pint; let it stand for two days, and then express, adding Dilute Acetic Acid to the mass until half a pint of the Acetous Solution is obtained. Add this to the above syrup, and agitate until all the Sugar is dissolved.

Properties and Uses.—This forms an efficient preparation for obstinate colds, catarrhs, hoarseness, and chronic irritation of the throat and fauces. The dose is from one to four fluidrachms, every two or three hours. The following compound, known as "*Cough or Vegetable Elixir,*" has been found a most beneficial agent in chronic pulmonary affections, cough, etc. To one gallon of good cider vinegar, add half a pound, each, of balsam of Tolu and gum Arabic, dissolve by heat, and add of refined sugar six pounds; when all is dissolved, remove from the fire, and add of tincture of opium, eighteen fluidounces. The dose of this is a teaspoonful three, four, or five times a day, or whenever the cough is severe. Sometimes molasses may be substituted for the sugar, or honey.

SYRUPUS COFFEÆ. *Coffee Syrup.*

Preparation.—Take of Coffee, roasted and ground, *one pound;* Simple Syrup *eight pounds;* Boiling Water *a sufficient quantity.* Treat the Coffee by displacement in a proper apparatus, with the Boiling Water until two pounds of liquor have passed; put the syrup on the fire, and evaporate until it loses two pounds, then add the infusion of Coffee and strain.

Properties and Uses.—Two tablespoonfuls of this syrup to a cup of boiling water or milk will make a cup of good coffee. It is much used in soda water and mineral waters, in which it may be less concentrated, and be diluted with simple syrup.—*Am. Jour. Pharm., XXVIII.*, 372.

SYRUPUS CORYDALLIS COMPOSITUS. *Compound Syrup of Turkey-corn.*

Preparation.—Take of the Root of Turkey-corn, coarsely bruised, *two pounds;* the Leaves of Twin-leaf *one pound;* Blue Flag-root *one pound;* Sheep-Laurel Leaves *half a pound.* 1. Mix the articles together; place the whole four pounds and a half in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water until two pints and four fluidounces of the Alcoholic Tincture have been obtained, which retain and set aside. 2. Then continue the percolation, and of this second Solution reserve so much as contains a sensible amount of Spirit, and distill or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the Solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second Solution after the evaporation of its Alcohol, it will make thirteen pints and a half. 4. To these two Solutions combined, add eighteen pounds of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds fifteen pints and twelve fluidounces, evaporate to that quantity with constant stirring. Then remove from the fire, and when nearly cold add the two pints and four fluidounces of Alcoholic Tincture first obtained and set aside, and make eighteen pints of syrup. It may also be flavored with some agreeable aromatic essence, as Sassafras, Wintergreen, Prickly-Ash Berries, etc.

Properties and Uses.—This is a valuable alterative syrup, and is used with much success in syphilis, scrofula, liver affections, and rheumatism. The iodide of potassium may be added to it, in the same manner as usually pursued with the Compound Syrup of Stillingia, to which this is by no means, second. The dose is a fluidrachm, three or four times a day in half a gill of water.—*J. K.*

Some twenty years since, a half-breed Indian, called Ben Smith, in the State of New York, made a syrup, which gained considerable reputation as a remedy in syphilitic diseases, and which sold rapidly for three dollars per bottle; the following is the formula for its preparation: Take of Indian Hemp (*Apocyn. Cann.*), Virginia Sarsaparilla, Inner Bark of White Pine, each, *one pound;* Mezereon *four ounces;* Sheep Laurel *half a pound;* Water *four gallons;* Sugar *eight pounds.* Place the Plants in the water, boil for a few minutes, and then gradually evaporate, until about two gallons of decoction are left, then strain, and add the Sugar. To each quart bottle of this Syrup he added *forty drops* of Nitric Acid, and *twenty grains* of Tartar Emetic dissolved in *a sufficient quantity* of Spirits. The dose was a wineglassful three times a day. I have never been able to ascertain the true botanical character of the Virginia Sarsaparilla. This syrup has been found as efficacious in syphilis, when prepared without the tartar emetic.

SYRUPUS IPECACUANHÆ. *Syrup of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, in powder, *eight ounces* Troy; Alcohol, sp. gr. 0.835, Syrup, of each, *a sufficient quantity.* Add the Ipecacuanha to *twelve fluidounces* of the Alcohol, and allow it to stand for twelve hours; then add *sufficient* Alcohol to make the mixture of the consistence of Syrup, and introduce the whole into a suitable displacer, in which it gradually settles down as the Alcohol percolates, a piece of muslin is laid on the surface, and when it has settled down uniformly, more Alcohol is added until the filtered liquid measures half a gallon, reserving the first half-pint that comes through; distill and evaporate the remainder to eight fluidounces, and then add the reserved half-pint. This forms a Fluid Extract of Ipecacuanha, of which two fluidounces represent one ounce Troy, of the root.

To four pints of Syrup add eight fluidounces of the above Fluid Extract of Ipecacuanha, and evaporate the Mixture to three pints; then add four pints of Syrup, and one pint of Water, making one gallon of Syrup of Ipecacuanha.

History.—Owing to the presence probably of gum and coloring matter, the Syrup of Ipecacuanha, as generally prepared by diluted alcohol, is very liable to fermentation; but made according to the above formula of Mr. Joseph Laidley, it contains but little, if any alcohol, possesses all the medicinal virtues of the drug, and keeps as well as simple syrup, without fermenting. When the four pints of syrup are added to the fluid extract, should it not be perfectly clear, it may be rendered so by mixing with water the white of one egg, adding it to the syrup, boiling for a few minutes and straining. Syrup of Ipecacuanha may also be prepared with diluted acetic acid, in the same manner as Syrup of Seneka, *on page* 1287.

Properties and Uses.—This syrup is emetic and expectorant; it is used principally among children. As an emetic the dose for an adult is one or two fluidounces; for a child one or two years old, one or two fluidrachms—to be repeated every ten or twenty minutes till it operates. When used as an expectorant, an adult may take one or two fluidrachms; a child, from five to twenty minims.

Mr. A. G. Dunn prepares a "*Saccharated Alcoholic Extract of Ipecacuanha,*" which he considers superior to any other preparation of the drug; it is made as follows: Bruise the Root of Ipecacuanha *four ounces*, to a coarse powder, and macerate for thirty days in Diluted Alcohol *sixteen fluidounces*, shaking it occasionally; then filter and express. The tincture thus formed is to be evaporated to two fluidounces, and then mixed with Refined Sugar, *eight ounces;* lastly, triturate in a stone mortar until it is entirely dry. This preparation has the peculiar odor and taste of Ipecacuanha, is of a brownish-yellow color, is soluble in water, alcohol, ether, mucilage of gum Arabic, etc., is of uniform strength, and agreeable to take. The dose is the same as the powdered root.

A very good syrup for ordinary cases of dysentery, is made as follows:

Take of Ipecacuanha Root, bruised, *one ounce;* Cold Water *a sufficient quantity.* Digest the bruised root, with sufficient cold water to cover it, for twelve hours; then place in a percolator and displace eight fluidounces. Then place Refined Sugar, in powder, *one ounce,* in the percolator and over the Ipecacuanha, and pour on the filtered liquor to again percolate through, until the Sugar is dissolved. The dose is a fluidrachm or two in about two fluidounces of water, repeating it every two or three hours.

SYRUPUS LIQUIDAMBAR. *Syrup of Sweet-gum.*

Preparation.—Take of Sweet-gum Bark, in coarse powder, *five ounces;* Refined Sugar *two pounds;* Water *a sufficient quantity.* Moisten the bark thoroughly with water, let it stand for twenty-four hours in a close vessel, then transfer it to a percolator, and pour water gradually on it until a pint of filtered liquor is obtained. To this add the sugar in a bottle, and agitate occasionally until it is dissolved.—*Dr. C. W. Wright.*

Properties and Uses.—This is a pleasant medicine, which is not apt to be ejected from an irritable stomach. It is very useful in bowel complaints of children, diarrhea, chronic cough, and chronic mucous affections generally. The dose for an adult is a fluidounce, three or four times a day; and in diarrhea, to be repeated after each evacuation from the bowels when they recur too frequently. Probably the Sweet-gum, or resinous exudation, dissolved in alcohol, or made into an emulsion, and then added to syrup, would answer a still better purpose.

SYRUPUS LOBELIÆ. *Syrup of Lobelia.*

Preparation.—Take of Vinegar of Lobelia *two pints;* Sugar *four pounds.* Dissolve with the aid of heat, not to exceed 180°, and continue the heat for three hours, removing any scum which may form, and strain while hot.

Properties and Uses.—This forms a pleasant expectorant syrup, and notwithstanding the volatile properties of lobelia are dissipated by heat, this syrup will be found sufficiently active for practical purposes; the long-continued digestion removes the peculiar, disagreeable taste of the lobelia. It will be found very useful in infantile cases of catarrh, pertussis, croup, pectoral diseases, to produce emesis, and to bring the system under the relaxing influence of lobelia. The dose is from one fluidrachm to half a fluidounce.—*N. T. Isgrigg.*

SYRUPUS MARRUBII COMPOSITUS. *Compound Syrup of Horehound.*

Preparation.—Take of the Bark of Red-root, Roots of Elecampane, Spikenard, and Comfrey, Bark of Wild Cherry, and Leaves and Tops of Horehound, each, *one pound;* Bloodroot *half a pound.* 1. Grind and mix the articles together; place the whole six and a half pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water, until three pints of the Alcoholic Tincture have been obtained, which retain and set aside. 2. Then continue the percolation, and of this second solution reserve so much as contains a sensible amount of Spirit, and distill or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its Alcohol, it will make eighteen pints. 4. To these two solutions combined, add *twenty-four pounds* of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds twenty-one pints, evaporate to that quantity with constant stirring. Then remove from the fire, and when nearly cold, add the three pints of Alcoholic Tincture first obtained and set aside, and make three gallons of syrup. Each pint will contain the virtues of four ounces of the ingredients.

Properties and Uses.—In the former Dispensatories, this article was called "*Syrupus Araliæ Compositus*," Compound Syrup of Spikenard, but in consequence of the great improvement in the formula, and from the fact that this name has been now bestowed upon another preparation, the name of the article under consideration has been changed to avoid confusion. This is an elegant remedy for obstinate coughs of long standing, and pulmonary affections generally. It has been called "Pulmonary Balsam," but is superior to the preparation bearing this name in past years. It is often employed advantageously in pulmonary and bronchial difficulties, combined with one-fourth part of Fluid Extract of Queen's Root. The dose of the syrup is half a fluidounce three or four times a day.

I am indebted to Mr. W. S. Merrell for the following formula for the Compound Syrup of Red-root (*Syrupus Ceanothi Compositus*) of Dr. Jas. Cooper: Take of the Tops and Leaves of Ceanothus Americanus, of the Bark of the Root of Ceanothus Americanus, and Herb Lactuca Elongata, each, *one pound;* Root of Cimicifuga Racemosa *half a pound;* Roots of Asclepias Tuberosa, and Asarum Canadense, each, *four ounces;* Lobelia Herb, and Root of Sanguinaria Canadensis, each, *two ounces.* Proceed as with Compound Syrup of Aralia, until one and a half gallons of tincture, and one and a half gallons of decoction is obtained. To the latter add *one gallon* of good sugar-house Molasses, and clarify with eggs. Then add the tincture to the warm decoction, and make four gallons of syrup. Used in coughs and pulmonary affections in doses of from one fluidrachm to half a fluidounce, four or five times a day.

SYRUPUS MITCHELLÆ COMPOSITUS. *Compound Syrup of Partridge-berry.*

Preparation.—Take of Partridge-berry *one pound;* Helonias Root, High-Cranberry Bark, Blue-Cohosh Root, each, *four ounces.* Grind, and mix the articles together; place the whole pound and three-quarters in a convenient vessel, cover them with fourth-proof Brandy, and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Brandy, until three pints of spirituous tincture have been obtained, which reserve. Then continue the displacement with Hot Water until the liquid passes tasteless; add to this *two pounds* of Refined Sugar, and evaporate by a gentle heat to *five pints;* remove from the fire, add the reserved *three pints* of Spirituous Tincture, and flavor with Essence of Sassafras. Strictly speaking, this is not a syrup, but a sweetened Infusion, yet I place it here, as being nearly in its appropriate class. It is often termed *Mother's Cordial*, but is superior to the article to which this name was formerly applied.

Properties and Uses.—This preparation is a uterine tonic and antispasmodic. It may be used in all cases where the functions of the internal reproductive organs are deranged, as in amenorrhea, dysmenorrhea, menorrhagia, leucorrhea, and to overcome the tendency to habitual abortion. The dose is from two to four fluidounces, three times a day. Pregnant females, especially those of a delicate, or nervous system, will find it an advantage to take one or two doses daily, for several weeks previous to parturition, as by the energy it imparts to the uterine nervous system, the labor will be very much facilitated, beside which, it frequently removes the cramps to which some females are liable during the latter weeks of utero-gestation. The medicine appears to exert a specific influence on the uterus.—*J. K.*

A preparation called the "*Parturient Balm*," has also been used and recommended in the above diseases, but I have found it to be of less efficacy; however, as some practitioners employ it, I introduce the formula for its preparation at this place: Take of Blue-Cohosh Root, Spikenard Root, each, *four pounds;* Black-Cohosh Root, Partridge-berry Herb, Queen-of-the-Meadow Root, each, *two pounds;* Ladies'-slipper Root, Comfrey Root, each, *one pound.* Proceed to make a syrup, similar to the directions given for the Compound Syrup of Aralia, reserving eight pints of the strongest tincture first obtained, using sixty-four pounds of Refined Sugar, and making eight gallons of syrup. The dose of this is from a teaspoonful to a tablespoonful three or four times a day.

SYRUPUS PHYTOLACCÆ COMPOSITUS. *Compound Syrup of Poke.*

Preparation.—Take of Poke-root, and Bark of American Ivy (*Ampelopsis Quinq.*), each, coarsely bruised, *one pound;* Black-Cohosh Root, coarsely bruised, and Sheep-Laurel Leaves, each, *half a pound.* 1. Mix the articles together; place the whole three pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water, until one pint and a half of the Alcoholic Tincture passes, which retain and set aside. 2. Then continue the percolation, and of this second solution reserve so much as contains a sensible amount of spirit, and distill or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its Alcohol, it will make nine pints. 4. To these two solutions, combined, add *twelve pounds* of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling, and if it exceeds ten pints and a half, evaporate to that quantity with constant stirring. Then remove from the fire, and when nearly cold, add the pint and a half of Alcoholic Tincture first obtained and set aside, and make one gallon and a half of syrup. Flavor with some aromatic essence, as Sassafras, Wintergreen, etc.

Properties and Uses.—This syrup is an excellent alterative and anti-syphilitic, and is beneficial in syphilis, scrofula, and rheumatism. If required, Iodide of Potassium may be added to it, as in the instance of Compound Syrup of Stillingia. The dose is a teaspoonful three or four times a day, in half a gill of water.—*J. K.*

SYRUPUS PRUNI VIRGINIANÆ. *Syrup of Wild-Cherry Bark.*

Preparation.—To hot Simple Syrup *one pint*, add coarsely powdered Wild-Cherry Bark, loosely placed in a coarse muslin bag, *five ounces.* Suspend the bag, with the Bark in it, in the syrup, and cover the vessel. Digest by a very gentle heat, for twenty-four hours, and then express all the fluid from the Bark in the bag, and add it to the rest of the syrup.

Properties and Uses.—This forms a handsome tonic and sedative syrup, which may be used in all cases where wild-cherry bark is indicated or desired. It may be given in doses of half a fluidounce.

SYRUPUS RHEI ET POTASSÆ COMPOSITUS. *Compound Syrup of Rhubarb and Potassa.*

Preparation.—Take of best India Rhubarb, in coarse powder, and Bicarbonate of Potassa, each, *one pound;* Cinnamon, Golden Seal, of each, *half a pound;* Refined Sugar *six pounds;* Fourth-proof Brandy *two gallons;* Oil of Peppermint *two fluidrachms.* Macerate the Rhubarb, Potassa, Cinnamon, and Golden Seal, in the Brandy for two days, then express the tincture with strong pressure, and add to it the Oil of Peppermint, previously dissolved in a little Alcohol. Break up the cake or compressed residue from the press, and place it in a displacement apparatus, and gradually add Warm Water, until the strength of the articles is exhausted. Evaporate this solution to eight pints, and while the liquor is still hot dissolve in it the Sugar. Continue the evaporation, if necessary, until when added to the tincture first obtained, it will make three gallons, and mix the two solutions together. Strictly speaking, this is not a syrup, but a sweetened tincture.—*W. S. M.*

Dr. Hill has kindly furnished me with the formula by which he prepares this syrup, and which many physicians prefer on account of its pleasantness and efficacy. It is as follows: Take of best India Rhubarb, in coarse powder, and pure Carbonate of Potassa, each, *two ounces;* Golden Seal, Cinnamon, each, *one ounce;* Refined Sugar *four pounds;* Brandy *one gallon;* Oil of Peppermint *twenty minims.* Macerate the Rhubarb, Golden Seal, and Cinnamon, in half a gallon of the Brandy for six hours, with a gentle heat; then transfer the mass to a percolator and displace with the remaining half-gallon of Brandy. The remaining strength, if there be any, can be obtained by adding Water until the liquor comes off tasteless. To this add the Carbonate of Potassa, Sugar and Oil of Peppermint, this last having been previously rubbed with a sufficient quantity of the Sugar to absorb it, and mix the two liquors. The whole of the active properties of the ingredients may be obtained with more certainty by using Alcohol seventy-six per cent., instead of Brandy, owing to the great want of uniformity in the quality of the latter.

Properties and Uses.—This syrup is an agreeable laxative, antacid, and tonic. It is sometimes called *Neutralizing Cordial*, but is much superior to the preparation having this name in past years. It may be used in cases of obstinate constipation, acidity of stomach, dyspepsia, and as a laxative in pregnancy and where piles are present. It is the principal remedy employed by physicians in diarrhea, dysentery, cholera-morbus, cholera-infantum, and in the same diseases as the compound powder of rhubarb. The dose for an adult is a tablespoonful, every half hour, hour, or two hours, according to the urgency of the symptoms; for a child in proportion to its age.

SYRUPUS RUMECIS COMPOSITUS. *Compound Syrup of Yellowdock.*

Preparation.—Take of Yellowdock-root *two pounds;* Bark of the Root of False Bittersweet *one pound;* Bark of American Ivy (*Ampelopsis Quinq.*), and Figwort (*Scroph. Mariland.*), each, *half a pound;* Refined Sugar *sixteen pounds.* 1. Grind and mix the drugs together, place the whole four pounds in a convenient vessel, cover them with Alcohol of seventy-six per cent., and macerate for two days. Then transfer the whole to a common displacement apparatus, and gradually add Hot Water, until two pints have been obtained, which retain and set aside. 2. Then continue the percolation, and of the second solution reserve so much as contains a sensible amount of Spirit, and distill or evaporate the Alcohol from it. 3. Continue the displacement, by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion till it begins to thicken, or until, when added to the balance remaining of the second portion, after the evaporation of the Alcohol, it will make twelve pints. 4. To these two solutions combined, add the Sugar, and dissolve by heat, carefully removing the scum which arises as it comes to the point of boiling. Then if it exceeds fourteen pints, evaporate to that quantity with constant stirring; remove from the fire, and when nearly cold, add the two pints of Alcoholic Tincture first obtained and set aside, and make two gallons of syrup. Each pint will contain the virtues of four ounces of the ingredients. It may be flavored with some aromatic essence. This syrup is sometimes called *Scrofulous Syrup*, but is superior to the article formerly known by this name.

Properties and Uses.—This syrup is alterative and antiscrofulous, and is extensively and successfully used in the treatment of scrofula, all scrofulous affections, and many cutaneous diseases. Iodide of potassium is frequently added to it, in the proportion of an ounce to the pint of syrup.

The dose is from one to four fluidrachms, three times a day, in about a gill of water; or when the iodide is added, one or two fluidrachms, in water.

SYRUPUS SANGUINARIÆ. *Syrup of Bloodroot.*

Preparation.—Take of Bloodroot, in coarse powder, *eight ounces;* Acetic Acid *four fluidounces;* Water *five pints;* Refined Sugar *two pounds*, Troy. Macerate the Bloodroot for three days, in two fluidounces of the Acetic Acid, and a pint of the Water; then transfer to a percolator, and displace with the remainder of the Acetic Acid mixed with the balance of the Water. Evaporate by means of a water-bath, to eighteen fluidounces, add the Sugar, and form a syrup.

History.—By the above process carefully conducted, the root will be exhausted, and a syrup of a deep ruby color obtained, opaque in quantity, but transparent in thin strata, having a strongly acrid and bitterish taste.

Properties and Uses.—This syrup may be used in all cases where Bloodroot is applicable, in doses of from ten to sixty drops. An excellent cough mixture is composed of equal parts of Syrup of Squill, Syrup of Balsam of Tolu, Syrup of Ipecacuanha, Syrup of Bloodroot, and Paregoric; the dose of which is a teaspoonful whenever the cough is troublesome. Syrups of Wild-Cherry bark, Bloodroot, Balsam of Tolu, and Fluid Extract of Stillingia, combined in equal proportions, have been found very useful in chronic bronchial and catarrhal affections. Prof. E. S. Wayne prepares a good expectorant by dissolving one grain of sulphate of sanguinarina in one fluidounce of simple syrup; the dose is half a fluidrachm, three or four times a day.

SYRUPUS SCILLÆ. *Syrup of Squill.*

Preparation.—"Take of Vinegar of Squill *eight fluidounces;* Refined Sugar, in powder, *one pound.* Dissolve the Sugar in the Vinegar of Squill with the aid of a steam or water heat."—*Dub.*

Properties and Uses.—Syrup of Squill is used as an expectorant in coughs and catarrhs, and as an emetic in affections of the air-passages in infants. It is frequently given in combination with tincture of lobelia, and other emetic or expectorant agents. A fluidrachm is the usual dose.

SYRUPUS SENEGÆ. *Syrup of Seneka.*

Preparation.—Take of Seneka, coarsely powdered, *four ounces;* Refined Sugar *a pound;* Diluted Acetic Acid *half a pint.* Cover the Seneka with sufficient *hot* Diluted Acetic Acid, and let it stand twenty-four hours; then transfer it to a displacement apparatus, and add Diluted Acetic Acid, hot, a sufficient quantity, until eight fluidounces have been obtained. Add the Sugar to this, and form a syrup by the aid of a gentle heat.

History.—Syrup of Seneka made in this manner is not so liable to mold, ferment, or crystallize, as by the process generally pursued, and is decidedly more agreeable. It has also been recommended to prepare the Syrup, according to the process laid down for Syrup of Ipecacuanha, by first preparing an Alcoholic Fluid Extract, and adding to it Simple Syrup;

by this method the separation of the gum and other matters which cause a tendency to fermentation, is entirely avoided.

Properties and Uses.—This forms a stimulating expectorant, which is often very useful in affections of the chest, etc. It is frequently combined with syrup of squill, tincture of lobelia, syrup of sanguinaria, etc. Its dose is one or two fluidrachms.

A syrup for coughs and catarrhal affections, known as *Jackson's Syrup*, is a very popular preparation in this city; as simplified by our principal druggists, its formula is: Take of Syrup of Seneka *five fluidrachms;* Syrup of Ipecacuanha *two and a half fluidrachms;* Syrup of Rhubarb *five fluidounces;* Muriate of Morphia *fifteen grains;* Simple Syrup *nineteen fluidounces;* Oil of Sassafras *half a fluidrachm;* mix together. The dose is a fluidrachm or two, three or four times a day.

SYRUPUS STILLINGIÆ. *Syrup of Queen's Root.*

Preparation.—Take of Queen's Root *three pounds;* Prickly-Ash Berries *one pound and a half;* Refined Sugar *eighteen pounds.* 1. Grind, and mix the articles together; place the whole four pounds and a half in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Alcohol, until five pints of the Alcoholic Tincture have been obtained, which retain and set aside. 2. Then continue the percolation with Hot Water, until the liquor passes almost tasteless, add the Sugar to it, and evaporate by gentle heat until thirteen pints are obtained; to which add the reserved five pints of Alcoholic Tincture, and make eighteen pints of syrup. It may be flavored with Essence of Sassafras, if required.

Properties and Uses.—This has been found highly beneficial in bronchial and laryngeal affections, also in obstinate cases of rheumatism, and wherever a stimulating alterative is required. The dose is from a fluidrachm to half a fluidounce, three, four, or five times a day, according to the urgency of the symptoms. It should be taken in water.

SYRUPUS STILLINGIÆ COMPOSITUS. *Compound Syrup of Queen's Root.*

Preparation.—Take of Queen's Root, and Root of Turkey-corn, each, *two pounds;* Blue Flag-root, Elder Flowers, and Pipsissewa Leaves, each, *one pound;* Coriander, and Prickly-Ash Berries, each, *half a pound.* 1. Grind, and mix the articles together; place the whole eight pounds in a convenient vessel, cover them with Alcohol of 76 per cent., and macerate for three days. Then transfer the whole to a displacement apparatus, and gradually add Hot Water until four pints of the Alcoholic Tincture have been obtained, which retain and set aside. 2. Then continue the percolation, and of this second solution reserve so much as contains a sensible amount of Spirit, and distill or evaporate the Alcohol from it. 3. Continue the displacement by Hot Water, until the solution obtained is almost tasteless, and boil down this weaker infusion until, when added to the second solution after the evaporation of its Alcohol, it will make twenty-four pints. 4. To these two solutions combined, add *twenty-four pounds* of Refined Sugar, and dissolve it by heat, carefully removing any scum which arises as it comes to the point of boiling; and if it exceeds twenty-eight pints, evaporate to that quantity, with constant stirring. Then remove from the fire, and when nearly cold add the four pints of reserved Alcoholic Tincture and make four gallons of syrup, each pint of which will be equal to four ounces of the ingredients in medicinal virtue.

Mr. Glenn, Druggist, St. Louis, Mo., has favored me with his formula for a Compound Syrup of Stillingia, which is very much liked by all physicians who have used it in their practice, being a prompt and efficient alterative. Take of Stillingia *four pounds;* Yellow-Dock Root, Pipsissewa, each, *two pounds*; Blue-Flag *one pound and a half;* Coriander, Corydalis, Prickly-Ash Berries, each, *one pound;* Bloodroot *half a pound;* Sugar *thirty-four pounds.* Make seven gallons of syrup in the way described above.

Properties and Uses.—This is a most powerful and effective alterative, and is extensively used by many practitioners in all syphilitic, scrofulous, osseous, mercurial, hepatic, and glandular diseases; or in every case where an alterative is indicated. It is most commonly given with an ounce of Iodide of Potassium added to each pint of the syrup. The dose is a fluidrachm, three or four times a day, in half a gill of water; but where the Iodide is omitted, the dose is from a fluidrachm to a fluidounce, three or four times a day, also in water. This is considered one of the most potent American remedies in all chronic diseases.

SYRUPUS TOLUTANUS. *Syrup of Tolu.*

Preparation.—Take of Tincture of Tolu *a fluidounce and a half;* Refined Sugar *two and a half pounds*, Troy; Water *a pint.* Mix the Tincture with one pound of Sugar in a shallow dish, and evaporate the Alcohol with the aid of a gentle heat, or allow it to evaporate spontaneously; then add the remainder of the Sugar, and dissolve it in twelve ounces of the Water. With the remaining four ounces of Water, beat up the white of one Egg, add it to the syrup, boil for one or two minutes, and strain through a Canton-flannel bag.—*J. Laidley.*

Prof. Procter recommends to triturate Balsam of Tolu, and Carbonate of Magnesia, of each, *half an ounce*, and Sugar *an ounce*, adding gradually Alcohol *a fluidounce*, and Water enough to make the whole measure *twelve fluidounces.* Filter, add Water to make a pint of liquid, and by means of a gentle heat dissolve in it Sugar *two and a half pounds*, and, if required, strain through damp cotton flannel. The ounce of Sugar used at first is to be taken from this last quantity.

Properties and Uses.—This syrup is used in coughs, and to give a pleasant taste to medicines; the dose is from half a fluidrachm to two, or even four fluidrachms.

SYRUPUS ZINGIBERIS. *Syrup of Ginger.*

Preparation.—Take of Tincture of the best Jamaica Ginger *two fluidounces;* Refined Sugar *five pounds;* Water *two pints.* Mix the Tincture with two pounds of Sugar in a shallow dish, and evaporate the Alcohol with the aid of a gentle heat, or allow it to evaporate spontaneously; then add the remainder of the Sugar, and dissolve it in twenty-four ounces of the Water. With the remaining eight ounces of the Water, beat up the whites of two Eggs, add it to the syrup, boil for one or two minutes, and strain through a Canton-flannel bag.—*J. Laidley.*

Prof. Procter recommends the following process: Take of Jamaica Ginger, in a uniform coarse powder, *four ounces*, pack it in a displacer, pour on slowly Deodorized Alcohol till eight fluidounces of tincture have passed, evaporate this spontaneously, or at 120° F., till reduced to three fluidounces; then triturate it with Carbonate of Magnesia *one ounce*, and Sugar *two ounces*, and add gradually Water *two pints.* Filter, and add enough Water to make the whole eight pints. In this dissolve Sugar *twenty pounds*, Troy, in a covered vessel, and, if necessary, strain through cotton flannel. The two ounces of Sugar used at first are to be deducted from this last quantity.

Properties and Uses.—Syrup of Ginger is used as a remedy in bowel complaints of children, and as a stimulating aromatic addition to various medicinal preparations. The dose is from half a fluidrachm to two, three or four fluidrachms.

SODA SYRUPS.

As most druggists retail soda and mineral waters, it may be of service to give a few formulæ for the preparation of the syrups with which they are flavored.

For Lemon Syrup, see Syrup of Citric Acid; see Ginger Syrup; also, Vanilla Syrup under Fluid Extract of Vanilla; see Coffee Syrup; see Wild-Cherry Syrup, and Sarsaparilla Syrup, in their appropriate places.

CREAM SYRUP.

Preparation.—Dissolve in *one gallon* of fresh sweet Cream, without heat, Powdered Sugar *fourteen pounds*, avoirdupois. If the cream be removed from the milk, add more sugar. Bottle this immediately, and keep upon ice; it will preserve well for from three to eight days. It is never used alone, but with various fruit syrups.

NECTAR CREAM.

Preparation.—Mix Cream Syrup *six parts*, with Vanilla Syrup *three parts*, and Sherry-wine, Pine-apple, and Lemon Syrups, of each, *one part.* To this mixture, a little Cochineal may be added to color it.

ALMOND CREAM SYRUP.

Preparation.—Take of fresh Jordan Sweet Almonds *twelve pounds*, avoir.; Milk *four gallons;* Sugar *sixty pounds*, avoir. Blanch the Almonds, beat them into a paste with some of the Milk and the Sugar; mix this paste with the rest of the Milk, press, and strain; dissolve the remainder of the Sugar in the mixture by means of a water-bath. This is used for the same purposes as Cream Syrup, and is more uniform and keeps better.

For *Fruit Syrups*, as Raspberry, Blackberry, Strawberry, Pine-Apple, etc., see *Parrish's Practical Pharmacy, pp.* 198 *to* 204.

TINCTURÆ.

Tinctures.

Tinctures are officinal preparations, obtained by subjecting certain medicinal articles to the action of alcohol, ether, etc., for the purpose of extracting their active principles. Some are prepared by simple maceration, or displacement, others require certain degrees of temperature. When alcohol, or diluted alcohol is employed as the solvent, the preparation is termed simply a *Tincture;* though, sometimes a small portion of acid or alkali is added to facilitate its solvent action. Occasionally, spirit of ammonia or ether are employed as the solvents, furnishing *Ammoniated tinctures*, and *Ethereal tinctures.* Tinctures are also prepared by means of gin, brandy, wine, etc., as the solvent; the former are termed *Spirituous Tinctures*, and those with wine, *Vinous Tinctures*, or *Medicated Wines.* When the principle to be dissolved is insoluble in water, rectified spirit, (alcohol of sp. gr. 0.835), is preferred as the menstruum ; when it is soluble in both alcohol and water, diluted or proof-spirit is preferred. The former is applicable to resins, volatile oils, oleo-resins, camphor, etc., and in which the addition of water would diminish or entirely prevent e solvent power of the alcohol. The latter is proper where the articles contain gum-resins, tannic acid, extractive, saline matters, etc. A *Simple Tincture* contains the active principles of a single substance ; a *Compound Tincture* contains the active principles of several articles.

In making tinctures, it must be observed, that the virtues of recent vegetable matters are very imperfectly extracted by spirituous menstrua. They must, therefore, be previously carefully dried, and as we can not assist the solution by means of heat, we must facilitate it, by reducing the solvend to a state of as minute mechanical division as possible.—*Coxe.* There are, however, some exceptions to this rule, as for instance, where the powder, by agglutination, presents an obstacle to the action of the solvent; in this case the substance to be acted on should be sliced, coarsely powdered, or, if finely powdered, be mixed with sand or other insoluble grains. When in a compound tincture, some of the agents are more soluble than the others, in order to prevent the solvent from holding too much of one article, and thereby diminishing its capability of dissolving the others, it is advised to place those articles in first which are of the most difficult solution, and adding the others from time to time according to their solubility, the most soluble articles being the last added.

Tinctures are prepared by percolation, or by maceration and digestion.

When by percolation or displacement, the tincture is speedily made, and is usually very active, but it does not answer where any large quantity of tincture is required, unless skillfully executed by persons experienced in the proper method of conducting it. When prepared by maceration, the ingredients are placed (in a coarse or fine powder as required) in a well-stopped glass vessel along with the menstruum. This is allowed to stand, in some cases seven, in others fourteen days, frequently shaking the mixture during this time. They should then be filtered, and expressed if necessary, in order to procure all the liquid. Some operators allow the dregs to remain, on the supposition that it contributes to preserve the uniformity of strength, and prevent any precipitation that might otherwise ensue; but this is an error.

Dr. H. Burton, in the *Lond. Med. Gaz.* Aug. 1844, gives a process for preparing tinctures, in which maceration and filtration are simultaneously conducted. The solid being loosely packed in a bag, which is suspended just under the surface of the solvent, so that all parts of it are immersed, and a space left between its lowermost end and the bottom of the macerating vessel. In this process no shaking or stirring is requisite; as soon as the spirit begins to act on the solid, a colored tincture will be seen to gravitate through the colorless and lighter spirit by which it is surrounded. In proportion to the rapidity with which the heavier tincture gravitates, a corresponding bulk of lighter spirit ascends, and is carried or forced into contact with the solid suspended at its surface. Thus, in a short time, a descending and ascending current will be established throughout the fluid, and will continue to move as long as the solid contains any soluble extract, or until the solvent has become saturated, and incapable of dissolving an additional quantity.

The expressed juices of plants are said to keep exceedingly well, by allowing them to stand till all foreign matters have subsided, then decant the clear juice, add half its weight of alcohol to it, allow this to stand for twenty-four hours, and then filter. Keep in well-stopped bottles in a cool and dark place. These are termed *Alcoolatures* or *preserved juices.*

All tinctures should be retained in bottles which are well stopped, in order to preserve them from evaporation, and thereby maintain a uniform degree of strength. The action of light as well as of air, has a deleterious influence upon tinctures, and, notwithstanding the custom of keeping them in clear bottles, it would be a much better plan to have the bottles containing them painted or varnished black. If all tinctures were prepared and dispensed, not according to the amount of drugs exhausted in them, but according to the specific gravity of the solvent employed in making the tincture, and the specific gravity of the subsequent tincture, there would be more uniformity of strength among this class of medicinal preparations, than at present; and by means of a hydrometer every druggist could keep his tinctures of the officinal strength. In order to preserve them, from decomposition or deterioration, all tinctures should be kept in bottles well closed with accurately fitting stoppers, and in a cool place.

Tinctures are generally prepared either by maceration, or by displacement:

1. *By Maceration.*—The powdered article or articles are placed in alcohol or diluted alcohol, as may be required, and are allowed to macerate in a close glass bottle, usually for fourteen days, with occasional agitation; after which they are expressed, if necessary, and filtered the tincture through paper.

2. *By Displacement.*—The powdered article or articles, are first covered with the menstruum with which the tincture is to be made, and allowed to stand until they are moistened throughout, and which generally requires from twenty-four to thirty-six hours; the whole is then transferred to a displacement apparatus, and the menstruum gradually poured on, and allowed to percolate or filter until the requisite amount has passed.

I am indebted to Mr. Wm. S. Merrell, of this city, an experienced and practical pharmaceutist, who has kindly furnished me with the following observations on this subject:

"A *Tincture*, in the pharmaceutical sense, is the solution of some medicinal substance in alcohol, either pure or diluted, and is mostly employed to separate the more active medicinal principles of vegetables from their woody fiber and other nearly inert substances, as starch, gum, and mucilage, which are not soluble in that menstruum, and present them in a liquid form. The greater part of the more active proximate principles of vegetables are soluble in strong alcohol, but many of them, especially in their native combinations, are also soluble in water, and a few, of an extractive or saline character, are more soluble in the latter than in the former menstruum. And in most cases an admixture of water facilitates the process of tincturing, by softening the mucilage and other principles not soluble in alcohol, thus enabling the latter to penetrate the substance, and act more readily. In these cases, therefore, a dilute spirit, or mixture of alcohol and water, should be used; and the proper proportions of such mixture for tincturing the different articles of the Materia Medica, becomes an important lesson to be learned by the apothecary and the physician.

In the tinctures recognized as officinal, in our Dispensatories, the strength of the solvent is, in most cases, indicated with sufficient accuracy, but in the progress of reform, a great number of medicines have been brought into use, in respect to which we have hitherto had no such guide. Some general suggestions may, therefore, be useful to the less experienced practitioner.

In all cases it is proper to use as dilute a spirit as is adequate to obtain the strongest practicable tincture, provided it be sufficiently strong to prevent fermentation, and preserve the solution from decomposition and change; for the alcoholic stimulant, in itself considered, is in most cases undesirable. The common alcohol of commerce, marked 76 per cent., is sufficiently strong for almost any of these preparations. It is strong enough to dissolve the resins, such as guaiacum, tolu, etc., and also the essential oils, in the proportions directed, and this is all that is required.

The dilute alcohol of the Dispensatory is nearly represented by a mixture of the two parts common alcohol, of 76 per cent., and one part water, which is about the right strength for the majority of the vegetable tinctures. Those roots, however, of which the medicinal virtues consist mostly of a resinoid, as podophyllum, leptandra, and many others, and also those vegetables containing much essential oil, require a solvent somewhat stronger than this, and either the 76 per cent. alcohol, or that reduced but little below this standard, say to the strength of fourth-proof spirits, should be used.

On the other hand, medicines which are almost wholly of an extractive character, as aloes, and others whose medicinal principles are soluble in water, require very dilute alcohol to tincture them (*see Tinct. Aloes, in U. S. Pharm.*), as the only use of the spirit in this case is to precipitate and render insoluble the mucilage, and to prevent the tincture from spoiling. Gum Kino should be tinctured in dilute alcohol, and not in strong, as directed in the Pharmacopœias; for if prepared in alcohol of officinal strength, it will rapidly gelatinize on standing, which will not be the case if prepared with spirit somewhat diluted, and kept in well-closed vessels.

In the preparation of tinctures from such vegetables as require dilute spirit, the process may be much facilitated, if not rendered more perfect by first wetting the ground or powdered substance with the proportion of water that is admissible, say one-third. Apply the water *hot*, and after digesting a short time, sufficient to expand the ligneous fiber, and soften or dissolve the gum, mucilage, etc., add the required proportion of alcohol, which can thus readily reach and dissolve the active principles soluble in it, while at the same time, it precipitates the dissolved mucilage, etc. For example:

TINCTURA CIMICIFUGÆ. *Tincture of Black Cohosh.*

℞	Black-Cohosh Root......	*four ounces.*
	Boiling Water..........................	*eight fluidounces.*
	Alcohol, 76 per cent............................	*one pint and a half.*

Powder or bruise the root, and pour the boiling water upon it, and let it digest for two hours; then, when sufficiently cool, transfer it to the bottle in which it is to be kept, and add the alcohol. Let it stand three days, frequently shaken, and filter for use.

[I differ somewhat with Mr. Merrell's method of preparing this tincture. As the virtue exists principally in the resin and oil, there is no necessity for the addition of any water to the preparation, and I have obtained much better results from the tincture, with strong alcohol, as I always prepare it, than from the diluted tincture.—*K.*]

Acting upon this principle, I many years ago made what I consider an improvement in the mode of preparing the tincture of opium, which should be adopted by every physician and apothecary. The directions in the old Pharmacopœias are, to slice the opium, and put it in the bottle with dilute alcohol, and macerate with frequent shaking, for two weeks; but if the opium be hard and compact, many small lumps will not be dissolved for a long time. I have examined the dregs of laudanum after standing six months under the tincture, and have found in them still unpenetrated pieces of pure opium. The consequence of such a mode of preparation is, that the tincture will at first be quite weak, and will continue to increase in strength until near the last, when it will be far above the standard strength, and liable to produce dangerous consequences. To avoid this objection, the later editions of the U. S. Pharmacopœias direct that the opium be first dried and powdered; but this adds one-fourth to the expense, if the opium be purchased ready powdered, and takes time, trouble and labor, which the physician can not often spare, to dry and powder it himself, and hence it is seldom done.

The whole difficulty may be avoided by the following method: Take of good Turkey Opium, 1200 grains (about 2½ ounces avoirdupois. This is the proportion required by most Dispensatories, although most of the laudanum sold in the shops is only the strength of one ounce avoirdupois to the pint). Slice the opium and pour over it half a pint (℥ viii.) boiling water, and work it with the pestle or hand until it is dissolved into a perfect emulsion, and no lumps can be felt in it, which is done in a very few minutes; then pour it into the bottle, and with two ounces more of warm water rinse your vessels, pestle, and hands, and add this to the above, and then add twenty fluidounces of common alcohol, 76 per cent. Shake it well. In this manner a quart, or any other quantity of laudanum can be made in half an hour, and in twenty-four hours it will be of full and uniform strength. In making each subsequent batch, the dregs of the former one should be poured out upon a paper filter in a funnel, and the alcohol for the new batch be percolated through it, thus preserving all the strength of this costly drug. I find that the Edinburgh College have in the latter editions of their Dispensatory, adopted a plan somewhat similar to the above, but much more troublesome and wasteful.

In the same manner we may advantageously make the tinctures of the gum-resins, as myrrh, assafetida, etc.; but in these cases a smaller proportion of water must be employed, unless it be counterbalanced by using the strong officinal alcohol, as the proper solvent for these gums is a stronger spirit than that required for opium."

TINCTURA ACONITI FOLIORUM. *Tincture of Aconite Leaves.*

Preparation.—Take of the dried Leaves of Aconite *two ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of Tincture.

Properties and Uses.—Tincture of Aconite Leaves possesses all the properties of Aconitum Napellus, and may be used wherever the drug is indicated, in doses of from ten to thirty drops. It should not be confounded with the tincture of the root, which is a much more powerful preparation.

TINCTURA ACONITI RADICIS. *Tincture of Aconite Root.*

Preparation.—Take of finely-powdered Aconite Root *eight ounces;* Dilute Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This is a much stronger preparation than the tincture of the leaves, and care should be employed not to use the two tinctures indiscriminately. It may be used for the same purposes, but in smaller doses, commencing with three drops in a teaspoonful of water, and gradually increasing it to ten or twelve drops.

TINCTURA ALOES. *Tincture of Aloes.*

Preparation.—" Take of coarsely powdered Socotrine Aloes *one ounce;* Extract of Liquorice *three ounces;* Distilled Water *a pint and a half;* Rectified Spirit *half a pint.* Macerate for fourteen days, and filter."—*Lond.*

Properties and Uses.—This is a cathartic and tonic, but is seldom used on account of its disagreeable taste, aloes being preferred in the pill form. As a cathartic, the dose is from half a fluidounce to a fluidounce and a half.

TINCTURA ALOES ET MYRRHÆ. *Tincture of Aloes and Myrrh. Elixir Proprietatis.*

Preparation.—Take of Aloes, in powder, *four ounces;* Saffron *two ounces;* Tincture of Myrrh *two pints.* Macerate for fourteen days, and filter.—*Lond.*

Properties and Uses.—This tincture is emmenagogue and cathartic; it has been beneficially employed in anemic and other abnormal conditions of the female system, connected with derangement of the menstrual secretion, and with constipation. It will likewise be found useful as a stimulating laxative, in cold, sluggish states of the system, unconnected with any menstrual difficulty. The dose is one or two fluidrachms.

TINCTURA ARALIÆ SPINOSÆ. *Tincture of Prickly Elder.*

Preparation.—Take of Prickly-Elder Bark, in powder, *three ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture is tonic, stimulant, and alterative; and is efficacious in chronic rheumatism, pulmonary affections, colic, flatulence, cholera-morbus, and Asiatic Cholera. It is useful in syphilis, in combination with the tincture of Turkey-corn. During the prevalence of cholera in 1849–50–51, it was added to emetic and cathartic medicines, for the purpose of preventing any tendency toward excessive discharges from the bowels. It also serves as a local stimulating application, when properly diluted with strong infusion of golden seal, in cases of chronic ophthalmia. The dose is from ten to sixty drops, three or four times a day.

TINCTURA ARNICÆ. *Tincture of Leopard's-bane.*

Preparation.—Take of Arnica-flowers *two ounces;* Diluted Alcohol *a pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture is principally used as a local application to sprains, bruises, wounds, etc.; but it may also be used internally in all cases where arnica would be applicable. The dose is from ten to thirty drops.

TINCTURA ASSAFŒTIDA. *Tincture of Assafetida.*

Preparation—" Take of Assafetida, in small fragments, *five ounces;* Rectified Spirit *two pints.* Macerate for fourteen days, and filter."—*Lond.*

Properties and Uses.—This tincture has all the efficacy of assafetida. The dose is from thirty to sixty drops. Added to water, the resin separates, and the solution becomes whitish.

Off. Prep.—Enema Assafœtidæ Composita.

TINCTURA ASSAFŒTIDÆ COMPOSITA. *Compound Tincture of Assafetida.*

Preparation.—Take of Assafetida, Lupulin, Stramonium Seeds, bruised, Valerian Root, in powder, each, *one ounce;* Alcohol *three pints.* Macerate for fourteen days, express, and filter.

Properties and Uses.—This tincture is used principally in epilepsy, though it will be found useful in hysteria, chorea, and other derangements of the nervous system. The dose is a fluidrachm, repeated every two or three hours, in severe cases; and in ordinary cases, three times a day, to be taken in water, tea, or wine.—*J. K.*

TINCTURA BELLADONNÆ. *Tincture of Belladonna.*

Preparation.—Take of recently dried Belladonna Leaves *two ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, making one pint of tincture.

Properties and Uses.—This tincture possesses all the virtues of belladonna, when prepared from the leaves, recently dried. The dose is from five to thirty drops. The imported leaves are of such uncertain strength that a tincture made from the alcoholic extract would be more trustworthy.

TINCTURA BENZOINI COMPOSITA. *Compound Tincture of Benzoin.*

Preparation.—"Take of Benzoin, in coarse powder, *three ounces and a half;* Purified Storax *two ounces and a half;* Powdered Aloes *five drachms;* Rectified Spirit *two pints,* Imperial measure. Macerate for fourteen days, and then filter."—*Lond.*

Properties and Uses.—This preparation has been known under various names, as, *Balsamum Traumaticum, Jesuits' Drops, Wound Balsam, the Commander's Balsam, Friar's Balsam,* etc. It is used as an expectorant in old coughs and catarrhs, and as a stimulating application to obstinate ulcers. Internally, the dose is from half a fluidrachm to one or two fluidrachms. *Turlington's Balsam,* a well known remedy, is composed of, Benzoin *six ounces;* Liquid Storax *two ounces;* Socotrine Aloes *half an ounce;* Peruvian Balsam *one ounce;* Myrrh *half an ounce;* Angelica-root *two drachms;* Balsam of Tolu *two ounces;* Extract of Liquorice *two ounces;* Alcohol *four pints.* Mix, digest for ten days and strain.—*Jour. of Phila. Coll. of Pharm.*, *V.*, 28. It is an improper application to fresh wounds.

TINCTURA CAMPHORÆ. *Tincture of Camphor.*

Preparation.—Dissolve Camphor *two ounces* in Alcohol *one pint.*

Properties and Uses.—This tincture is stimulant and antispasmodic. It is used externally as a stimulant and anodyne in sprains, bruises, chilblains, paralysis, and chronic rheumatism. Internally it is used for various purposes, in commencing diarrhea, in flatulency, nausea, griping pains, and wherever a stimulating or antispasmodic action is required. The dose is from ten to sixty drops, in mucilage or syrup, or merely added to water or gruel.

TINCTURA CAMPHORÆ COMPOSITA. *Compound Tincture of Camphor. Rheumatic Tincture. Rheumatic Drops or Liniment.*

Preparation.—Take of Camphor *one pound;* Oil of Origanum, Oil of Hemlock, each, *half a pound;* Oil of Sassafras, Oil of Cajeput, each, *two ounces;* Oil of Turpentine *one ounce;* Capsicum *four ounces;* Alcohol *one gallon.* Macerate for fourteen days, and filter.

Properties and Uses.—This is exceedingly efficacious as an external application, in almost every painful affection; and is of advantage in chronic rheumatism, pains in various parts of the system, bruises, sprains, chilblains, contusions, lameness, numbness, white swellings, and other swellings, etc. In ordinary cases apply two to four teaspoonfuls to the affected part, and rub it well by the fire; and apply warm flannel over the region of the affected part, several times a day. Internally, take twenty drops on sugar; but in severe and obstinate cases, after bathing as above directed, apply an additional piece of flannel, which must be kept constantly wet with the drops, until relieved. When applied to the teeth, wet a small quantity of cotton, and introduce it into the decaying teeth; if the face is swollen bathe with it likewise.—*J. K.*

TINCTURA CANNABIS INDICÆ. *Tincture of India Hemp.*

Preparation.—Take of Purified Extract of India Hemp *half a drachm;* Alcohol *one fluidounce.* Dissolve the Extract in the Alcohol.—*Dub.*

Properties and Uses.—This forms a powerful sedative narcotic, which has been used in neuralgia, cholera, and other symptoms where the India Hemp has been recommended, with much success. The dose is five drops, gradually increased to twenty or forty, according to its influence.

TINCTURA CANTHARIDIS. *Tincture of Spanish-flies.*

Preparation.—Take of Spanish-flies, in coarse powder, *half an ounce;* Diluted Alcohol *one pint.* Form into a tincture by Maceration, or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This is the best form for the administration of Cantharides, in chronic gonorrhea, gleet, amenorrhea, and some urinary derangements. Externally, it is sometimes used as a rubefacient, but care should be taken to avoid its vesicating action. The dose is from ten to sixty drops, every three or four hours.

TINCTURA CAPSICI. *Tincture of Cayenne Pepper.*

Preparation.—Take of Cayenne Pepper, in powder, *half an ounce;* Diluted Alcohol *one pint.* Form into a tincture by Maceration, or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—Tincture of Cayenne Pepper is a useful and permanent stimulant, and may be administered in depressed states of the system with torpor of the stomach, as with inebriates, and in typhoid stages of febrile diseases; also to prevent the nausea which oil of turpentine is apt to occasion. It is also useful in gangrenous sore-throat, and to remove relaxation of the uvula, applied to the part on a camel's-hair pencil, or as a gargle; for this purpose it may be diluted, if required, with mucilage of elm-bark; it is also an excellent application to the eye in cases of chronic ophthalmia. It is frequently applied locally, with advantage, in cases of swellings, rheumatic pains, partial paralysis, atrophied muscles, etc. The dose is from ten to sixty drops in water, three, four, or five times a day, according to the urgency of the case.

TINCTURA CARDAMOMI. *Tincture of Cardamom.*

Preparation.—Take of Cardamom, bruised, *two ounces;* Diluted Alcohol *one pint.—Ed.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture is aromatic and carminative; and is useful in mild colic, flatulency, nausea, gastric debility, etc.; it is also advantageously added as a pleasant aromatic to several mixtures, tinctures, infusions, etc. The dose is a fluidrachm or two.

TINCTURA CARDAMOMI COMPOSITA. *Compound Tincture of Cardamom.*

Preparation.—Take of Cardamom-seeds, Cinnamon, each bruised, *four drachms;* Caraway, bruised, *two drachms;* Cochineal, bruised, *a drachm;* Raisins, stoned, *four drachms;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This is a very pleasant aromatic tincture, and is used for the same purposes as the tincture of cardamom, and in the same doses.

TINCTURA CASTOREI. *Tincture of Castor.*

Preparation.—Take of Castor, bruised, *ten drachms;* Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture should always be prepared from the Russian castor, if possible; its properties are the same as the castor in substance, and may be given in doses of from twenty minims to two fluidrachms.

TINCTURA CASTOREI AMMONIATA. *Ammoniated Tincture of Castor.*

Preparation.—Take of Castor, bruised, *two ounces and a half;* Assafetida, in small fragments, *ten drachms;* Spirit of Ammonia *two pints* (Imperial measure). Digest for seven days in a well closed vessel; strain, and strongly express the residuum, and filter.—*Ed.*

Properties and Uses.—This is antispasmodic and stimulant, useful in various affections of the nervous system, hysteria, spasmodic affections of the stomach, etc. Inflammation contra-indicates its use. It may be given in doses of from half a fluidrachm to two fluidrachms.

TINCTURA CATECHU. *Tincture of Catechu.*

Preparation.—Take of Catechu, in moderately fine powder, *three ounces and a half;* Cinnamon, in fine powder, *two ounces and a half;* Diluted Alcohol *two pints*, Imp. meas.—*Ed.* Form into a tincture by Maceration or Displacement, as explained on page 1293, making two pints of tincture.

Properties and Uses.—This forms an astringent tincture, useful in chronic diarrhea, dysentery, etc. The dose is from half a fluidrachm to three fluidrachms ; it may be administered in some mucilage, sweetened water, or Port wine. On long keeping, it is apt to gelatinize, and thus become inert.

TINCTURA CAULOPHYLLI COMPOSITA. *Compound Tincture of Blue Cohosh.*

Preparation.—Take of Blue-Cohosh Root, in powder, *two ounces;* Ergot, Water-pepper, of each, bruised, *one ounce;* Oil of Savin *half a fluidounce;* Alcohol *one pint and a half.* Add the powders to the Alcohol, and form into a tincture by Maceration or Displacement, as explained on page 1293, to which add, lastly, the Oil of Savin ; the whole making one pint and a half of tincture.

Properties and Uses.—This forms an emmenagogue tincture, very useful in amenorrhea, dysmenorrhea, and other uterine affections. The dose is a fluidrachm two or three times a day.

TINCTURA CIMICIFUGÆ COMPOSITA. *Compound Tincture of Black Cohosh.*

Preparation.—Take of the Saturated Tincture of Black Cohosh *four fluidounces;* Saturated Tincture of Bloodroot *two fluidounces;* Saturated Tincture of Poke-root *one fluidounce.* Mix together.

Properties and Uses.—This is a valuable alterative and expectorant, and appears to exert a specific influence on the lungs, rendering the breathing easy, diminishing the frequency of the pulse, and the general excitability of the system. It is used in pulmonary affections, hemoptysis, hepatic diseases, dyspepsia, laryngitis, etc. The dose is from half a fluidrachm to a fluidrachm every two or three hours, according to the indications. A very slight degree of nausea produced and maintained by it, will be found to result in the most decided benefit.—*J. K.*

TINCTURA CINCHONÆ. *Tincture of Peruvian-bark.*

Preparation.—Take of Cinchona Bark (Calisaya), in powder, *six and a half ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This tincture is commonly used as an adjuvant to other preparations of bark or quinia. It may be given in doses varying from a fluidrachm to half a fluidounce. However, it is seldom used alone.

TINCTURA CINCHONÆ COMPOSITA. *Compound Tincture of Peruvian-bark.*

Preparation.—Take of Calisaya Bark, in powder, *four ounces;* Bitter Orange-peel, bruised, *three ounces;* Virginia Snakeroot, in moderately fine powder, *six drachms;* Saffron, chopped, *two drachms;* Cochineal, bruised, *a drachm;* Good French Brandy *twenty fluidounces.*—*Lond.* Form it into a tincture by Maceration or Displacement, as explained on page 1293, and make twenty fluidounces of tincture.

History.—This tincture is generally known as *Huxham's Tincture of Bark.* It is commonly prepared with diluted alcohol, instead of brandy, but I have introduced brandy as the solvent, more especially on account of the preparation made from it, called *Ferrated Tincture of Peruvian-bark.*

Properties and Uses.—This tincture is an efficient stomachic bitters, and may be used wherever a mild tonic of this character is desired. The dose is two or three fluidrachms, or more.

TINCTURA CINCHONÆ FERRATA. *Ferrated Tincture of Peruvian-bark.*

Preparation.—Take of the Compound Tincture of Peruvian-bark *one pint;* Hydrated Sesquioxide of Iron, dried at a temperature not exceeding 130° F., *four drachms;* Ammonio-citrate of iron *two hundred and fifty-six grains.* To the Compound Tincture add the Hydrated Sesquioxide, and digest until all the Cincho-tannin, whether pure, oxidized, or combined, is completely eliminated. Then filter and wash the tannate and excess of oxide with Boiling Alcohol to remove any trace of Alkaloid which may have been precipitated with the tannin; this alcoholic solution may be evaporated to dryness, the product dissolved in a little Water acidulated with Citric Acid, and added to the filtered liquor along with the Ammonio-citrate of Iron.

Properties and Uses.—This forms an exceedingly agreeable and energetic invigorative, admirably adapted in the cases of weak and languid habits of children and females, where the body is in a pallid or flaccid state, and very susceptible of fatigue or morbid action. It does not solely depend on the quinia and iron it contains for its value as a curative agent; the grateful and by no means inefficient adjuvants, the orange-peel, snakeroot, and other proximate principles of cinchona, independent of quinia, are by no means to be overlooked, and can not be replaced by salts of quinia and iron alone, however scientific their artificial combinations may appear. Each fluidounce contains sixteen grains of ammonio-citrate of iron. The dose is one or two fluidrachms, three or four times a day.—*Saml. Simes.*

TINCTURA CINNAMOMI.—*Tincture of Cinnamon.*

Preparation.—Take of Cinnamon, bruised, *three ounces and a half;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—Tincture of Cinnamon is an aromatic astringent, and may be used in chronic diarrhea, menorrhagia, uterine hemorrhage, and as an adjunct to other astringent solutions. One, two, or four fluidrachms, as required, may be administered for a dose, in sweetened or mucilaginous liquid.

TINCTURA CINNAMOMI COMPOSITA. *Compound Tincture of Cinnamon.*

Preparation.—Take of Cinnamon, bruised, *an ounce;* Cardamom, Prickly-Ash Berries, Ginger, of each, bruised, *three drachms*; Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This is a very warm and agreeable aromatic tincture, beneficial in flatulence, debility, or spasm of the stomach, and chronic diarrhea. The dose is a fluidrachm or two, in sweetened water.

TINCTURA COCCI CACTI. *Tincture of Cochineal.*

Preparation.—Take of Cochineal, in fine powder, *two ounces;* Diluted Alcohol *ten fluidounces.—Dub.* Form into a tincture by Maceration, as explained on page 1293, and make ten fluidounces of tincture.

Properties and Uses.—This tincture is calmative and antispasmodic, and may be given in pertussis, asthma, hysteria, and nervous diseases, in doses of from twenty drops to a fluidrachm. It is also employed for coloring various fluid mixtures.

TINCTURA COLCHICI SEMINIS. *Tincture of Colchicum Seed.*

Preparation.—Take of Colchicum Seed, bruised, *two ounces;* Diluted Alcohol *one pint.—Ed.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture may be used wherever colchicum is indicated. It is also employed as an external application in gouty, neuralgic, and rheumatic pains. The dose is from thirty drops to one or two fluidrachms.

TINCTURA COLCHICI COMPOSITA. *Compound Tincture of Colchicum.*

Preparation.—Take of Colchicum Seed, bruised, *two ounces;* Black-Cohosh Root, in powder, *three ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture;

Or, it may be made by adding together equal parts of the Tinctures of Colchicum Seed, and Black-Cohosh Root.

Properties and Uses.—This forms an excellent agent in inflammatory rheumatism and gout, and has proved a superior remedy in phlegmasia dolens, or the swelled leg of parturient women. The dose is from ten to sixty drops. or more, as circumstances indicate, every one, two, three, or four hours. Iodide of potassium, fifteen grains to the ounce of tincture, may frequently be added with advantage.—*J. K.*

TINCTURA COLOMBÆ. *Tincture of Colombo.*

Preparation.—Take of Colombo, bruised, *three ounces;* Diluted Alcohol *two pints.—Ed.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This tincture forms a bitter tonic; it may be added to liquid tonic preparations, whenever it is required to slightly augment their tonic action. The dose is from one to four fluidrachms.

TINCTURA CORYDALIS. *Tincture of Turkey-corn.*

Preparation.—Take of the Root of Turkey-corn, in powder, *three ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This forms an efficient alterative-tonic, useful in all cases where simple tonics are indicated, and highly beneficial in syphilitic and scrofulous affections. The dose is from twenty drops to two fluidrachms, three or four times a day.

TINCTURA DIGITALIS. *Tincture of Foxglove.*

Preparation.—Take of the Leaves of Digitalis, recently dried in moderately fine powder, *four ounces*; Diluted Alcohol *two pints.—Ed.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This preparation possesses the virtues of Foxglove, and affords an excellent mode of exhibiting that narcotic. The dose is from five to twenty drops, two or three times a day, and increased, if required, with much care.

TINCTURA ERGOTÆ. *Tincture of Ergot.*

Preparation.—Take of Ergot of Rye, in coarse powder, *eight ounces*; Diluted Alcohol *twenty fluidounces.—Dub.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make twenty fluidounces of tincture.

Properties and Uses.—This tincture may be used in all cases where the action of ergot is indicated or desired. The dose is one or two fluidrachms.

TINCTURA FERRI ACETATIS. *Tincture of Acetate of Iron.*

Preparation.—Take of Sulphate of Iron *eight ounces;* Distilled Water *half a pint;* Pure Sulphuric Acid *six fluidrachms;* Pure Nitric Acid *half a fluidounce;* Acetate of Potassa *eight ounces;* Rectified Spirit *half a gallon.* (The above weights are avoirdupois, and the measures Imperial.) To nine fluidounces of the Water add the Sulphuric Acid, and in the mixture, with the aid of heat, dissolve the Sulphate of Iron. Add next the Nitric Acid, first diluted with the remaining fluidounce of Water, and evaporate the resulting solution to the consistence of a thick syrup. Dissolve this in one quart (two pints, Imp. meas.,) and the Acetate of Potassa in the remainder of the Spirit, and, having mixed the solutions and shaken the mixture repeatedly in a large bottle, let the whole be thrown upon a calico filter. When any further liquid ceases to trickle through, subject the filter, with its contents, to expression, and having cleared the turbid tincture thus procured by filtration through paper, let it be added to that already obtained. The specific gravity of this tincture is 0.891.—*Dub.*

History.—By the mutual action of sulphate of iron, sulphuric acid, and nitric acid, a solution of the sulphate of the sesquioxide of iron is obtained. This is decomposed by the acetate of potassa, the products being acetate of the peroxide of iron, and sulphate of potassa; the former remains in the liquid, the latter is precipitated. It is a transparent, claret-colored tincture, having a strong chalybeate taste.—*P.*

Properties and Uses.—This is tonic, and astringent, and beside its internal administration as a chalybeate, it forms an excellent vaginal enema for leucorrhea, when properly diluted with water. The dose of it is from ten drops to a fluidrachm, given in a sufficient quantity of water.

TINCTURA FERRI CHLORIDI. *Tincture of Chloride of Iron. Tincture of Muriate of Iron.*

Preparation.—As the tincture according to the usual formula, is apt to vary in strength and other properties, various modes have been tried to prepare an unchangeable tincture. Mr. W. S. Thompson, of Baltimore, Md., gives the following as of invariable strength, maximum therapeutic power, and insensibility to change: Place in a flask or other convenient vessel, *six ounces*, Troy, of Sesquioxide of Iron prepared from Subcarbonate heated to redness, then add *one pint* of Muriatic Acid, and let it stand for six or seven hours, with occasional agitation. Then gently heat by a sand-bath, adding portions of acid from time to time, until all the oxide has been dissolved. When cool, add Alcohol, sufficient to make the whole measure four pints, and filter. It forms a clear tincture, a fluidounce of which represents 45 grains of sesquioxide. He also gives another formula, which gives a more elegant and exact compound, but involves much care and labor in the practical details of its operation. It is: Take of pure crystallized Protosulphate of Iron *five and one-fourth ounces*, Troy; Muriatic Acid, *a sufficient quantity;* Commercial Alcohol, 95 per cent., *half a pint.* Convert the Protosulphate of Iron into sesquioxide, in the manner directed on page 1117, or according to U. S. Pharmacopœia. Having carefully washed it, allow it to settle for at least twenty-four hours, then draw off with a syphon, as much of the water as possible, place the Oxide in a glass or porcelain dish, and gradually add Muriatic Acid until the whole of the oxide is dissolved. The solution at this stage has a ruby-red color. Next apply heat to the dish, and continue the addition of Acid until the liquid assumes a reddish-brown color, care being taken not to add an excess; then evaporate the solution to eight fluidounces, pour in the Alcohol, and filter. This tincture is weaker in alcohol than that commonly prepared, and yields 45 grains of dry sesquioxide to the fluidounce.—*Am. Jour. Pharm.*, *XXIX.*, 300. In the same journal, p. 289, is another formula for this tincture, which is uniform and permanent, proposed by Dr. E. R. Squibbs, U. S. Navy.

History.—This tincture has a deep reddish-brown color, an ethereal smell, and an extremely styptic taste. It stains white paper yellow. It has an acid and styptic taste, and an odor of hydrochloric ether. Its reaction is acid. On exposure to the air, a small deposit of sesquioxide of iron may take place, slightly diminishing the strength of the tincture, but a small quantity of hydrochloric acid added will redissolve this deposit. When the tincture is evaporated, a dark orange-colored sesquioxide is obtained, which is hardly crystallizable, deliquescent, and is composed of three equivalents of chlorine, and two of iron. It is *incompatible* with vegetable astringent infusions, gum Arabic solution, alkalies and their carbonates. Its sp. gr. is about 0.992, and, when decomposed by potassa, a fluidounce yields nearly 30 grains of sesquioxide of iron.—*P.*

Properties and Uses.—This chalybeate tincture is tonic, diuretic and astringent. It is very useful in anemia, chlorosis, scrofula, chronic gonorrhea, gleet, retention of urine from spasmodic stricture, leucorrhea, passive hemorrhages from the urinary organs, and in diarrhea during the low stage of fevers. I have found it especially beneficial in this last-named difficulty. The dose is from ten to thirty drops, two or three times a day, diluted with a sufficient quantity of water. In doses of from ten to twenty drops, in water, and repeated every two hours, the tincture of Chloride of Iron has been found a valuable agent in the treatment of erysipelas, usually effecting a cure in from two to six days, and during the employment of which, the only local applications necessary are hair powder, and cotton-wadding. The bowels to be kept open. Externally, it has proved useful in destroying venereal warts, and is one of the best applications that can be applied to a venereal chancre. In this last, it should be applied by means of a feather; and a piece of lint moistened with it, should be kept in constant contact with the surface of the ulcer. As an application to chancre, it is the only one that I have made for the last twenty-four years (except the nitric acid during its pustular stage), and is, in my opinion, decidedly the best local remedy for this kind of ulcer that can be used. Occasionally it causes severe pain, when it should be diluted with as little water as possible, but in the majority of instances after the first or second application, patients hardly notice it. It keeps the chancre clean, its surface soft, and changes the poisonous character of the virus, so that its absorption is followed by no bad result. As the chancre soon becomes so changed, by the uses of this tincture, that it is frequently difficult to detect it from the healthy surrounding integuments, the practitioner must be careful not to be misled by this appearance and cease his internal treatment too soon. I have used this tincture, as above named, since the year

1836, and, as far as I know, am the first one in the profession who employed it in this manner, or made its value known in the above disease.

The *Perchloride* or *Sesquichloride of Iron*, in concentrated solution, has been proposed in the treatment of aneurism and varicose veins; a few drops are injected into the artery or vein, the blood in which for a short distance around becomes converted, in a few minutes, into a solid clot. I have no doubt but that perchloride of iron applied locally, and taken internally in connection with the inspissated juice of conium maculatum, would prove beneficial in cancer; it is certainly worthy a trial.

TINCTURA GELSEMINI. *Tincture of Yellow Jessamine.*

Preparation.—Take of the fresh Root of Yellow Jessamine, cut into small pieces, *eight ounces;* Diluted Alcohol *two pints.* Macerate for fourteen days, express and filter. This forms a saturated tincture, beautifully tinged with violet; it has a peculiar odor, somewhat resembling that of new honey, and a faint, peculiar, not unpleasant taste.

Properties and Uses.—This tincture possesses the active properties of the root, and may be given as a febrifuge in intermittent, remittent, typhus, typhoid, and many other fevers; it is likewise beneficial in neuralgia, nervous headache, toothache, etc. And combined with tincture of cimicifuga, or tincture of colchicum, it proves decidedly efficacious in rheumatism and gout. In rigidity of the os uteri, puerperal convulsions, puerperal peritonitis, and painful dysmenorrhea, I consider this the very best agent in the Materia Medica. I have employed it in all these various conditions and with the most marked success. It is preferable to lobelia as a relaxant, as it does not occasion any nausea or vomiting. To one young lady laboring under a most agonizing dysmenorrhea, I administered a teaspoonful of the tincture every half-hour for four hours, before it produced its influence upon her; after which, smaller doses sufficed to maintain its effect, and she suffered no further pain during the menstruation. While it produces a relaxation of the rigid os uteri, it seems to exert an influence on the uterine contractility, promoting this action of the organ. However, I have only noticed this latter effect in a few instances; further investigations are required before we can place any reliance on this therapeutical action from its administration during parturition. The dose of the tincture of gelseminum is from ten drops to a fluidrachm, according to circumstances, and the urgency of the case. The effects of an overdose may be removed by holding aqua ammonia to the nostrils, with the internal administration of stimulants.

TINCTURA GENTIANÆ COMPOSITA. *Compound Tincture of Gentian.*

Preparation.—Take of Gentian, Colombo, Swamp Milkweed, Rhubarb, Prickly-Ash Berries, Sassafras, each, in powder, *one ounce;* Good French Brandy *four pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make four pints of tincture.

Properties and Uses.—This is a mild aperient, stimulant, and tonic, and is especially adapted to children with debilitated stomachs, or disordered condition of the digestive organs, after the administration of anthelmintics for the removal of worms, and during convalescence from exhausting diseases, as summer-complaint, diarrhea, dysentery, fevers, etc. The dose is from ten drops to a teaspoonful three or four times a day, in sweetened water.—*J. K.*

TINCTURA GUAIACI. *Tincture of Guaiacum.*

Preparation.—Take of Guaiacum-resin, in powder, *seven ounces:* Alcohol *two pints,* Imperial measure. Digest for fourteen days, and then filter.—*Ed.*

Properties and Uses.—This tincture is used in gout, rheumatism, dysentery, amenorrhea, and dysmenorrhea; the dose is from one to three fluidrachms, three or four times a day, given in mucilage, or sweetened water. *Dewees' Tincture of Guaiacum* (Tinctura Guaiaci Alkalina), recommended in suppression of the menses and dysmenorrhea, is made as follows: Take of the best Guaiac, in powder, *four ounces;* Carbonate of Soda or of Potassa, *one drachm and a half;* Pimento, in powder, *an ounce;* Diluted Alcohol *a pound.* Digest for a few days. Dose, a teaspoonful three times a day, to be gradually increased, if necessary.—*Dewees' on Diseases of Females*, 1826, p. 81.

TINCTURA GUAIACI AROMATICA. *Aromatic Tincture of Guaiacum. Greenhow's Cholera Mixture.*

Preparation.—Take of Guaiacum, Cloves, and Cinnamon, each, in powder, *one ounce;* Brandy *two pints.* Macerate for fourteen days and filter.

Properties and Uses.—This tincture is an excellent aromatic stimulant, astringent, and diaphoretic. It was extensively used in Cincinnati, by practitioners, during the cholera of 1849–50–51, and with excellent effect. The late Prof. T. V. Morrow, considered it as one of the best agents in the treatment of that disease. The dose is from a teaspoonful to a tablespoonful, in sweetened water, every fifteen or twenty minutes, until relief is obtained. The addition of an ounce of Prickly-Ash Berries to this tincture will materially enhance its efficacy.

TINCTURA HYDRASTIS. *Tincture of Golden Seal.*

Preparation.—Take of Golden-Seal Root, in powder, *three ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture is tonic, and will be found beneficial in chronic gastric affections, hepatic diseases, chronic diarrhea, and general debility. Diluted and applied locally, it forms an efficacious remedy in leucorrhea, and ophthalmia. The dose is from ten to sixty drops, two or three times a day, in water.

TINCTURA HYDRASTIS COMPOSITA. *Compound Tincture of Golden Seal.*

Preparation.—Take of Golden-Seal Root, Lobelia Seed, each, in powder, *two ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture. Or it may be made by adding together equal parts of the tinctures of Golden Seal, and Lobelia.

Properties and Uses.—This is a valuable local application to diseased mucous surfaces. It is highly recommended in chronic catarrh, to be snuffed up into the nostrils, or applied by means of a camel's-hair pencil; it is also useful in chronic ophthalmic diseases, diluted with water.

TINCTURA HYOSCYAMI. *Tincture of Henbane.*

Preparation.—Take of Henbane Leaves, dried, *four ounces;* Diluted Alcohol *two pints.*—*Lond.*, 1826. Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This tincture is sedative and soporific, and is frequently used in cases where opium does not agree, or where its constipating effects are not desired. Sometimes the Tincture of Henbane purges; when this is the case, a small portion of laudanum may be added to it. The dose is from half a fluidrachm to a fluidrachm.

TINCTURA HYPERICI. *Tincture of St. John's-wort.*

Preparation.—Take of the Blossoms of St. John's-wort (recent) *five ounces;* Alcohol *one pint.* Macerate for fourteen days, express, and filter.

Properties and Uses.—This tincture may be used to fulfill the indications of the plant, but its principal use is as a local application to wounds, bruises, ulcers, swellings, tumors, ecchymosis, etc. The dose internally is from half a fluidrachm to a fluidrachm. As a local application it is equal to Arnica.

TINCTURA IGNATIÆ AMARÆ. *Tincture of St. Ignatius'-bean.*

Preparation.—Take of St. Ignatius'-bean *four ounces*, Troy; Alcohol, Water, of each, *a sufficient quantity.* Reduce the Beans to a coarse powder by mill or pestle, moisten the powder with two fluidounces of Water, and in any suitable bottle cork it and heat by a water-bath till the powder is swollen; then pour on half a pint of Alcohol, and digest for three hours by the same means; throw the contents of the bottle on a percolator and slowly displace with Alcohol until a pint of tincture is obtained.

Properties and Uses.—Administered in nervous affections, and wherever the tincture is indicated. The dose is five or ten drops three times a day.—*Prof. W. Procter, Jr.*

TINCTURA IODINII. *Tincture of Iodine.*

Preparation.—Dissolve Iodine *a drachm* in Alcohol *two fluidounces.*

The Tincture of Iodine should be placed in closely-stopped vials. It is inferior to the Compound Tincture of Iodine, on account of being decomposed by the action of light, or of air, giving rise to hydriodic acid, free iodine, etc.; beside, it is more apt to irritate the stomach, from the deposition of solid iodine when the tincture is taken in water. It should not be prepared in large quantities. In preparing the tincture, the iodine should be well dried. It has a deep-brown color, becomes gradually decomposed on standing, or on the addition of water.

Properties and Uses.—This preparation is seldom administered internally, on account of the tendency to deposition of iodine, and consequent irritation produced by the crude iodine. When given, the dose is ten drops, gradually increased to thirty, two or three times a day, to be administered in water sweetened with loaf-sugar, or wine. Thirty drops are about equal to one grain of iodine. Its principal use is externally, in cutaneous scrofula, erysipelatous diseases, pernio, eczema, pityriasis, and other diseases of the skin, acute rheumatism, ulcers, etc. It may be applied by means of a camel's-hair pencil.

TINCTURA IODINII COMPOSITA. *Compound Tincture of Iodine.*

Preparation.—Take of Iodine *an ounce;* Iodide of Potassium *two ounces;* Rectified Spirit *two pints.* Macerate till they be dissolved, and filter. The filtering ordered in this formula is unnecessary, and may be dispensed with.

Properties and Uses.—This tincture may be used internally for all the purposes to which iodine is applicable. Unlike the tincture of iodine, it is not decomposed when water is added to it. The dose is five drops, three times a day, gradually increased to thirty if required.

TINCTURA IRIDIS. *Tincture of Blue Flag.*

Preparation.—Take of Blue-Flag Root, in powder, *three ounces;* Alcohol *a pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make a pint of tincture.

Properties and Uses.—The Tincture of Blue Flag possesses the same alterative and cathartic properties as the root, and may be used in all cases as a substitute for the powder, in doses of from ten to sixty drops, according to the effect desired, two or three times a day. Six fluidrachms, each, of the Tinctures of Blue Flag, and Mandrake roots, with two fluidrachms of a saturated tincture of Nux Vomica, form an efficacious remedy in obstinate constipation, hepatic torpor, derangements of the spleen, sick headache, want of appetite, syphilitic affections, gleet, recent stricture of the urethra, impotency from masturbation, recent disease of the prostate, etc. The mixture may be given in doses of from ten to fifteen drops, in water, two or three times a day.

TINCTURA KALMIÆ. *Tincture of Sheep Laurel.*

Preparation.—Take of Sheep-Laurel Leaves *three ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make a pint of tincture.

Properties and Uses.—This preparation is sedative and alterative, and may be successfully used in jaundice, syphilitic diseases, palpitation of the heart, etc., in doses of ten drops, carefully and gradually increased to thirty. In obstinate syphilitic affections, I frequently add a portion of this tincture to the compound syrup of stillingia, with marked advantage.

Externally, the tincture is beneficial in itch, and some other cutaneous affections.

TINCTURA KINO. *Tincture of Kino.*

Preparation.—Take of Kino, in powder, *three ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture. When made by Displacement, the Kino should be mixed with its weight of sand previous to placing it in the percolator.

Properties and Uses.—Tincture of Kino is astringent, and is principally used in diarrhea, cholera-morbus, cholera, etc., in doses of one or two fluidrachms; it is frequently added to astringent mixtures. It is very liable to gelatinize on standing, and lose its astringency, especially if exposed to the action of the atmosphere; hence, it should be made frequently, *in small quantities at a time*, say, half a pint, and be kept in well closed bottles.

TINCTURA KRAMERIÆ. *Tincture of Rhatany.*

Preparation.—Take of powdered Rhatany-root *two ounces and a half;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This is useful in chronic diarrhea, and other cases where an astringent is required. It likewise forms an excellent local application to the gums, where they are tender, spongy, and bleed. The dose is one or two fluidrachms in sweetened water, or wine, if not contra-indicated, three or four times a day.

TINCTURA LARICIS COMPOSITA. TINCTURA PINUS PENDULÆ COMPOSITA. *Compound Tincture of Tamarac.*

Preparation.—Take of Tamarac Bark, Juniper Berries, of each, *six ounces;* Prickly-Ash Bark *four ounces*; Wild-cherry Bark, Seneca Snakeroot, of each, *three ounces*; Tansy *one ounce*; Whisky *five pints*; Molasses *a pint and a half*; Hydro-alcoholic Extract of Mandrake *an ounce and a half*; Water *a sufficient quantity.* Let the medicinal Herbs, Roots, and Barks, be coarsely pulverized and mixed together. To the mixture add *three pints* of the Whisky, and let them stand twenty-four hours; then place the whole in a vapor displacement apparatus, and force through the articles the steam, or vapor of the additional Whisky *two pints*, after which the steam from Water sufficient to make the whole amount of tincture equal to *twenty-four pints.* To this add the Molasses, and the Hydro-alcoholic Extract of Mandrake; which last must be thoroughly dissolved.

Properties and Uses.—Although not properly a tincture, yet to avoid a new class of pharmaceutic agents, *bitters*, I place this compound among the tinctures. It is an improvement upon the old preparation called Bone's Bitters, and is now generally preferred by physicians. It possesses nearly four times the strength of that heretofore made, and consequently must be taken in a much smaller dose, a desideratum with all medicines containing alcohol. The whisky and juniper berries are less expensive, and more readily obtainable than the pure Holland Gin recommended in the original, and likewise render the preparation more actively diuretic; and the substitution of the extract of mandrake, for the bitter, and to many patients, unbearable taste of aloes, renders it much more valuable as a cholagogue, alterative, and aperient. It forms an excellent alterative tonic and aperient for dyspeptic affections, menstrual derangement, hepatic torpor, constipation, urinary difficulties, etc. The dose is half a fluidounce, three times a day, about an hour previous to each meal.

TINCTURA LAVANDULÆ COMPOSITA. *Compound Spirit of Lavender.*

Preparation.—Take of Oil of Lavender *three fluidrachms;* Oil of Anise *one drachm and a half;* Cloves, in powder, *one ounce;* Mace *three drachms;* Red Saunders *two ounces;* Brandy *four fluidounces;* Jamaica Rum *one gallon.* Macerate for fourteen days, express, and filter through paper.

Properties and Uses.—This is far superior to, and makes a much more agreeable compound than the formula of the U. S. Pharmacopœia. It forms a delightful preparation which is much employed as a remedy for flatulence, hysteria, gastric uneasiness, nausea, and general languor or faintness. It is also used as an adjuvant and corrigent of other medicines. The dose is from thirty drops to a fluidrachm or two, given in sweetened water, or on sugar.—*J. K.*

TINCTURA LEPTANDRÆ. *Tincture of Black-root.*

Preparation.—Take of Black-root, in powder, *three ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This preparation is aperient and cholagogue, and is employed in various derangements of the biliary organs; it is also added to medicine for summer-complaint, chronic diarrhea, remittent fever, etc. The dose is from half a fluidrachm to two fluidrachms, two or three times a day.

TINCTURA LOBELIÆ. *Tincture of Lobelia.*

Preparation.—Take of the recently dried Leaves and Tops of Lobelia *two ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture possesses the same properties as Lobelia; the dose is from thirty to sixty drops as a nauseant; and half a fluidounce, or more, as an emetic. A tincture prepared of equal parts of vinegar and alcohol, instead of diluted alcohol, is preferable to the above, in cases where it is not to be kept for a length of time. Externally, the Tincture of Lobelia is beneficial as a local application in tetter and similar cutaneous eruptions, stings of insects, and in the poisoning by rhus.

TINCTURA LOBELIÆ COMPOSITA. *Compound Tincture of Lobelia. Dr. J. King's Expectorant Tincture.*

Preparation.—Take of Lobelia (herb), Bloodroot, Skunk-Cabbage Root, Wild-Ginger Root, and Pleurisy-root, each, coarsely powdered, *one ounce;* Water (or Vinegar) *one pint;* Alcohol *three pints.* Form a tincture by Maceration or Displacement, as explained on page 1293, and make four pints of tincture.

Properties and Uses. — This tincture forms an excellent emetic for children and infants, and may be safely used in croup, hooping-cough, bronchitis, asthma, convulsions, and in all cases where an emetic is required. It will likewise be found beneficial as an expectorant, or nauseant in coughs, pleuritic affections, asthma, pertussis, and whenever expectorants are indicated. It is a most valuable compound.

In croup, for children one year old, give half a tablespoonful in a tablespoonful of molasses, and repeat it every fifteen minutes, until it vomits; after which, a teaspoonful may be given every hour or two, as required—the vomit to be repeated two or three times a day. A child from two to six months old, may take from a half to a teaspoonful for a dose; less than two months old, from fifteen to twenty-five drops, to be repeated every ten minutes, if vomiting is required. Children from three to six years old, may take a tablespoonful, in molasses or warm water, every ten minutes, until it vomits. Warm boneset or thoroughwort tea, ought always to be given in order to facilitate its operation as an emetic.

For cough, asthma, etc., to promote expectoration and remove tightness across the chest; and in all ordinary cases where an expectorant is required, adults may take one or two teaspoonfuls in half a wineglassful of slippery-elm tea, three to five times a day, or as often as required. Children from one year old to ten, may take from half to a teaspoonful in the same manner: and for those less than one year, from ten to thirty drops. Should the above doses vomit, they should be lessened, except when vomiting is desired. The stomach and bowels must be kept regular in all cases, by gentle medicines.

TINCTURA LOBELIÆ ET CAPSICI COMPOSITA. *Compound Tincture of Lobelia and Capsicum. Antispasmodic Tincture.*

Preparation.—Take of Lobelia, Capsicum, and Skunk-Cabbage Root, each, in powder, *two ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Or, it may be made by combining together, equal parts of the saturated tinctures of Lobelia, Capsicum, and Skunk-Cabbage Root.

Properties and Uses.—This tincture is a powerful antispasmodic and relaxant, and will be found highly efficacious in cramps, spasms, convulsions, tetanus, etc. The dose is from half a teaspoonful to a teaspoonful, every ten or twenty minutes, or as often as the urgency of the case requires.

In hysteria, convulsions and tetanus, in which swallowing is difficult, it may be poured into the corner of the mouth, and repeated as often as necessary; it will find its way into the stomach; generally, the effect is almost instantaneous. This valuable preparation should always be in the possession of every physician. In rigidity of the os uteri, a teaspoonful administered by mouth, or by enema into the rectum, and repeated in fifteen or twenty minutes, will be found to produce a state of softness and dilatability without the necessity of using the lancet, so highly recommended by a certain class of practitioners, in such cases.

TINCTURA LUPULINI. *Tincture of Lupulin.*

Preparation.—Take of Lupulin *five ounces;* Alcohol *two pints.* Macerate for fourteen days and filter through paper.—*Dub.*

Properties and Uses.—Lupulin is the active principle of hops, and as the quantity of it varies in different specimens of hops, a tincture of it is decidedly preferable to one made of hops. It may be employed with advantage in coughs, after-pains, and in all cases where opium is inadmissible. The dose is one or two fluidrachms in mucilage or sweetened fluid of some kind.

TINCTURA MENTHÆ VIRIDIS. *Tincture of Spearmint. Spirits of Mint.*

Preparation.—Take of the fresh Herb of Spearmint *a sufficient quantity* to fill a glass jar, and cover with good Holland Gin. Macerate for seven days, express, and filter.—*Beach's Am. Prac.*

Properties and Uses.—This tincture is diuretic and stimulant. It may be beneficially employed in strangury, retention of urine, gravel, and various chronic nephritic diseases. The dose is from two to four ounces, three times a day; but in severe and painful cases it may be repeated every half-hour or hour until relief is obtained. Externally, it forms an excellent application to hemorrhoids when in a state of inflammation; cotton must be moistened with it, and applied to the part.

TINCTURA MYRRHÆ. *Tincture of Myrrh.*

Preparation.—Take of Myrrh, bruised, *three ounces;* Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—Tincture of Myrrh is used as a stimulating application to obstinate, fetid ulcers, and to promote the exfoliation of carious bones.—*Coxe.* It is also useful as a wash, either alone or diluted with water; ulceration of the mouth and throat, spongy and bleeding gums, etc. Internally, it has been used in chronic cough, catarrh, etc., as a stimulating expectorant; also as an emmenagogue. The dose is from half a fluidrachm to a fluidrachm.

TINCTURA MYRRHÆ COMPOSITA. *Compound Tincture of Myrrh.*

Preparation.—Take of Myrrh, bruised, *eight ounces;* Capsicum *two ounces;* Alcohol *one gallon.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one gallon of tincture.

Properties and Uses.—This preparation, frequently termed *Hot Drops,* from its resemblance to a compound of similar composition formerly in use, is rarely employed internally. Occasionally, however, it is used in cases of nausea, gastric distress, especially after a hearty meal, flatulence, etc., in doses of from half a fluidrachm to a fluidrachm, in sweetened water. Its internal employment is contra-indicated when inflammation is present. Its principal use is externally, when it proves an excellent local application to sprains, bruises, fresh wounds, cuts, rheumatism, offensive ulcers, etc.

TINCTURA NUCIS VOMICÆ. *Tincture of Nux Vomica.*

Preparation.—Take of Nux Vomica, rasped, *two ounces;* Alcohol *eight fluidounces.*—*Dub.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make eight fluidounces of tincture.

Properties and Uses.—This tincture possesses the properties of the nux vomica, but as the seeds vary in their quantity of active matter, it is an inferior preparation to the tincture of strychnia or alcoholic extract of nux vomica. Its extreme bitterness is a great objection to its employment. It is occasionally employed in doses of from five to ten or twenty drops; and as an external application in local paralytic affections.

TINCTURA OLEI ANISI. *Tincture of Oil of Anise. Essence of Anise.*

Preparation.—Take of Oil of Anise *one fluidounce;* Alcohol *nine fluidounces*, Imp. meas. Mix with agitation.—*Dub.*

Properties and Uses.—This preparation is aromatic, antispasmodic, and carminative, and may be employed in flatulency, cough, cramp of the stomach, and to flavor other preparations. The dose is from twenty to sixty drops for an adult, in sweetened water. The following forms a very pleasant preparation for cough: Take of Aqua Ammonia, Tincture of Opium, each, one fluidounce; Essence of Anise, half a fluidounce. Mix. Dose, from twenty to sixty drops.

TINCTURA OLEI CARUI. *Tincture of Oil of Caraway. Essence of Caraway.*

Preparation.—Take of Oil of Caraway *one fluidounce;* Alcohol *nine fluidounces*, Imp. meas. Mix with agitation.—*Dub.*

Properties and Uses.—This is aromatic, carminative, and antispasmodic. It may be used in flatulency, nausea, etc., and to flavor mixtures. The dose is from twenty to sixty drops in sweetened water.

TINCTURA OLEI CINNAMOMI. *Tincture of Oil of Cinnamon. Essence of Cinnamon.*

Preparation.—Take of Oil of Cinnamon *one fluidounce;* Alcohol *nine fluidounces*, Imp. meas. Mix with agitation.—*Dub.*

Properties and Uses.—This tincture possesses the stimulant and aromatic properties of cinnamon, and may be beneficially employed in menorrhagia and uterine hemorrhage, in which a teaspoonful may be taken in a wineglass of sweetened water, every five, ten, or thirty minutes, according to the urgency of the symptoms.

TINCTURA OLEI MENTHÆ PIPERITÆ. *Tincture of Oil of Peppermint. Essence of Peppermint.*

Preparation.—Take of Oil of Peppermint *one fluidounce;* Alcohol *nine fluidounces*, Imp. meas. Mix with agitation.—*Dub.*

Properties and Uses.—Tincture of Oil of Peppermint, more commonly known as *Essence of Peppermint*, is carminative and antispasmodic. It may be used in nausea, colic, flatulency, cramp or gripings of the bowels, etc. The dose is from ten to thirty drops on sugar, or in sweetened water.

TINCTURA OLEI MENTHÆ VIRIDIS. *Tincture of Oil of Spearmint. Essence of Spearmint.*

Preparation.—Take of Oil of Spearmint *one fluidounce;* Alcohol *nine fluidounces*, Imp. meas.—*Dub.* Mix with agitation.

Properties and Uses.—This preparation is antispasmodic, carminative, and diuretic, and may be employed similarly to the essence of peppermint. The dose is from twenty to forty drops, on sugar, or mixed with sweetened water.

TINCTURA OLEI SASSAFRAS. *Tincture of Oil of Sassafras. Essence of Sassafras.*

Preparation.—Take of Oil of Sassafras *two fluidounces;* Alcohol *a pint.* Dissolve the Oil in the Alcohol.

Properties and Uses.—This tincture is stimulant, carminative, diuretic, and alterative. Its principal use is to flavor syrups and other fluid preparations. The dose is from ten to thirty drops on sugar, or mixed with sweetened water.

N. B. The usual proportions in this country for the preceding essences, are *one fluidounce* of the Oil used, dissolved in *eight fluidounces* of Alcohol.

TINCTURA OPII. *Tincture of Opium. Laudanum.*

Preparation.—Take of good Turkey Opium, sliced, *twelve hundred grains;* Boiling Water *ten fluidounces;* Alcohol 76 per cent., *twenty fluidounces.* Pour eight fluidounces of the Boiling Water on the Opium, and with the hand or pestle, reduce it to an emulsion; then pour it into the bottle in which it is to be kept, rinse the pestle or hand with the remaining two fluidounces of Warm Water, and add it to the fluid in the bottle, together with the Alcohol. Agitate well, and set it aside; in twenty-four hours it will be of full strength. (See Mr. Merrell's remarks on Tinctures, page 1293–4.)

Properties and Uses.—This tincture possesses the medicinal virtues of opium, and may be used in all cases where the drug is indicated, in doses of from ten to forty drops. Twenty-five drops are about equal to a grain of opium.

If Diluted Acetic Acid be employed in the above formula instead of water, it will form a much better tincture, and one less liable to vary in strength—the TINCTURA OPII ACETATA, or *Acetated Tincture of Opium*, and which may be given in the same doses as above.

The following is offered to the profession by Eugene Dupuy, Pharmaceutist, of New York, as a substitute for *McMunn's Elixir of Opium* (a trial of six years has been accorded to it, and none of the unpleasant effects attributed to Laudanum have as yet attended its administration): Take of Opium *ten drachms*, make it into a thin pulp with a sufficient quantity of water; then allow the mixture to stand in a cool place forty-eight hours; after which transfer it into an elongated glass funnel containing filtering paper, and add a superstratum of Water equivalent to the bulk of the whole mass. When twelve ounces of liquid have filtered, add to the filtered solution, Alcohol 95 per cent., *four ounces*. The solution is an Aqueous Solution of Opium, nearly free from narcotina, preserved by alcohol, and contains about two-thirds of the substance of the Opium—the residue consisting chiefly of resin, narcotina, caoutchouc, ligneous matter, etc.

For a similar purpose, the following mode of preparation is recommended in the *American Journal of Pharmacy*.

Macerate *ten drachms* (Troy) of Opium, in *half a pint* of Water, for two days, and express; subject the dregs to two successive macerations, using *six fluidounces* of Water each time, with expression; mix and strain the liquors, evaporate them to two fluidounces, and agitate the liquid with Sulphuric Ether *four fluidounces*, several times during half an hour. Then separate the Ether by means of a funnel, evaporate the solution of Opium to dryness, dissolve the extract in *half a pint* of Cold Water, pour the solution on a filter, and after it has passed wash the filter with sufficient water to make twelve fluidounces of filtered solution, to which add *four fluidounces* of Alcohol.

By this process the ether removes all that the water has dissolved of the thebaina, the meconin, a part of the codeia, the odorous principle, meconate of narcotine, and fatty matter. The evaporation to dryness, and resolution in water, removes the ethereal odor, and separates a portion of acid, resin, and extractive. Sydenham's laudanum, on page 686, is the *Tinctura Opii Crocata*, or Saffronised Tincture of Opium of the Prussian Pharmacopœia.

TINCTURA OPII CAMPHORATA. *Camphorated Tincture of Opium. Paregoric Elixir.*

Preparation.—Take of Opium, sliced, or in powder, Benzoic Acid, each, *four scruples;* Camphor *two scruples and a half;* Oil of Anise *one fluidrachm;* Diluted Alcohol *two pints.—Ed.* Form into a tincture by Maceration, as explained on page 1293. Two fluidrachms of this tincture is equivalent to about half a grain of opium.

Properties and Uses.—This is a very valuable and useful opiate, which is efficacious in allaying troublesome cough, nausea, hooping-cough, slight gastric and intestinal pains; to cause sleep, and palliate diarrhea. The dose for an adult, is one or two fluidrachms; for an infant, from five to ten or twenty drops.

The nostrums known by the names of *Bateman's Drops* and *Godfrey's Cordial*, two very dangerous articles in the hands of nurses and many non-professional persons, are generally prepared as follows: *Bateman's Pectoral Drops.* Take powdered Opium, powdered Catechu, Camphor, Red Saunders, rasped, each, *two drachms;* Oil of Anise *half a fluidrachm;* Diluted Alcohol *four pints.* Mix, and macerate for twelve or fourteen days. Two fluidrachms are equivalent to about half a grain of Opium. *Godfrey's Cordial.* Dissolve Carbonate of Potassa *six drachms*, in Water *six pints and a half;* add Sugar-house Molasses *four pints*, and gently heat them to form a solution, removing any scum which floats upon the surface. Remove from the fire and add Laudanum *six fluidounces*, Alcohol *eight fluidounces*, in which has been dissolved *one fluidrachm* of Oil of Sassafras. A fluidrachm of this Cordial is equivalent to somewhat more than one-fourth of a grain of opium.

The coroner of Nottingham states, that "Godfrey's Cordial is given to children to a great extent; and that he has no doubt whatever that many infants are yearly destroyed in that borough, but who dying gradually, never come under his notice officinally." There can be no doubt of the truth of this assertion. At all events we can say positively that such instances occur elsewhere.—(*Dunglison's Am. Med. Lib. and Intell., Jan.* 1840. p. 299).

TINCTURA PODOPHYLLI. *Tincture of Mandrake.*

Preparation.—Take of Mandrake-root, in powder, *three ounces;* Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture possesses the alterative, cholagogue, purgative, and other properties of the root, and may be used wherever that is indicated. The dose is from ten to sixty drops.

TINCTURA POLYGONI. *Tincture of Water-pepper.*

Preparation.—Take of Water-pepper, the fresh herb, *a sufficient quantity* to fill a quart jar; then add Holland Gin, or Proof-spirit, as much as can be held in the jar. Macerate for seven days, express and filter.

This tincture may likewise be made from the dried herb, in powder, *six ounces* to *one pint and a half* of Proof-spirit, and macerating for fourteen days; or by percolation, as explained on page 1293.

Properties and Uses.—This tincture has been used with efficacy in amenorrhea, dysmenorrhea, suppressed lochial discharge, and in moderate menorrhagia. The dose is a teaspoonful three or four times a day.

TINCTURA QUINIÆ COMPOSITA. *Compound Tincture of Quinia. Ague Bitters.*

Preparation.—Take of Quinia *thirty grains;* Cream of Tartar *one ounce;* Cloves, in powder, *one ounce;* Whisky *one pint.* Macerate for twenty-four hours, and filter.

Properties and Uses.—This tincture is febrifuge, antiperiodic, and tonic, and is used in intermittent and remittent fevers, and other diseases attended with symptoms of a periodical character. In intermittent fever, the dose for an adult is half a fluidounce every hour during the intermission, until two or three hours previous to the return of the next expected chill, when the dose should be given every half-hour. The dose for children is one or two fluidrachms.—*T. V. M.*

TINCTURA RHEI. *Tincture of Rhubarb.*

Preparation.—Take of Rhubarb, bruised, *three ounces and a half;* Cardamom Seeds, bruised, *half an ounce;* Diluted Alcohol *two pints.*—*Ed.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This tincture is purgative, stomachic, and tonic. It is principally used in flatulent colic, dyspepsia, constipation, and in low forms of fever. The dose, as a purgative, is from half a fluidounce to a fluidounce; as a stomachic, one, two, or three fluidrachms.

TINCTURA RHEI COMPOSITA.—*Compound Tincture of Rhubarb.*

Preparation.—Take of Rhubarb, bruised, *four ounces;* Bitter-root, Golden Seal, Gentian, Prickly-Ash Berries, each, bruised, *two ounces;* Sassafras, Cardamom Seeds, each, *one ounce;* Diluted Alcohol *five pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make five pints of tincture.

Properties and Uses.—Compound Tincture of Rhubarb is laxative, tonic, and stomachic; it is especially useful in debilitated conditions of the digestive organs, hepatic torpor, dyspepsia, constipation, and to restore the tone of the bowels after the removal of worms, after diarrheas, dysenteries, etc. The dose is from half a fluidounce to a fluidounce, two or three times a day in sweetened water, or sufficient to procure one, but not over two alvine evacuations daily.—*J. K.*

TINCTURA SANGUINARIÆ. *Tincture of Bloodroot.*

Preparation.—Take of Bloodroot, in powder, *six ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—In the dose of two to four fluidrachms, this tincture will prove emetic; and from ten to sixty drops will act as a nauseant, expectorant, stimulant, and alterative. As all the medicinal virtues of bloodroot are taken up by alcohol, I do not see the necessity of using this liquid diluted. For several years past I have been accustomed to prepare this tincture with undiluted alcohol, which I have found to give a much better medicinal solution, and to be more satisfactory in its effects.

TINCTURA SANGUINARIÆ ACETATA COMPOSITA. *Compound Acetated Tincture of Bloodroot. Acetous Emetic Tincture.*

Preparation.—Take of Bloodroot, Lobelia, Skunk-Cabbage Root, each, in powder, *two ounces;* Distilled Vinegar *two pints;* Alcohol *two fluidounces.* Place the drugs in the Vinegar, and form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture, to which add the Alcohol.

Properties and Uses.—This preparation is much used by physicians as an emetic and expectorant, in all cases where such agents are required. As an emetic, the dose is from one to four fluidrachms, in some sweetened aromatic infusion, to be repeated every ten or fifteen minutes until vomiting is produced; as an expectorant the dose is from twenty to sixty drops, every hour or two. It also forms a useful external application to erysipelas, tetter, and other forms of cutaneous disease.

TINCTURA SANGUINARIÆ COMPOSITA. *Compound Tincture of Bloodroot. Emetic Tincture.*

Preparation.—Take of Bloodroot, Lobelia, Skunk-Cabbage Root, each, in powder, *two ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This tincture is used for the same purposes, in the same manner and dose, as the preceding one.

TINCTURA SENNÆ COMPOSITA. *Compound Tincture of Senna. Elixir Salutis.*

Preparation.—Take of Alexandria Senna *two ounces;* Jalap, in powder, *one ounce;* Fennel or Coriander Seeds, bruised, *half an ounce;* Raisins, deprived of their seeds, *three ounces;* Best French Brandy, or Diluted Alcohol, *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.—*Ed.*—*Lond.*

Properties and Uses.—This is an excellent purgative, especially for children, as it acts mildly and pleasantly; it is also useful in cases of constipation attended with flatulence. The dose for an adult is from half a fluidounce to a fluidounce; for a child a year old, a fluidrachm. It may be given in a little sweetened water.

TINCTURA SERPENTARIÆ COMPOSITA. *Compound Tincture of Virginia Snakeroot. Sudorific Tincture.*

Preparation.—Take of Virginia Snakeroot, in powder, Ipecacuanha, Saffron, Camphor, and Opium, in powder, each, *two ounces;* Holland Gin, or Diluted Alcohol, *six pints.* Macerate for fourteen days, express, and filter through paper.—*Beach's Am. Prac.*

The above is the original, and undoubtedly the best form of preparing this tincture, yet some physicians are opposed to the Opium, and substitute in its place Ladies'-slipper Root *eight ounces.*

Properties and Uses.—This is a powerful sudorific, and is used in all cases where a copious perspiration is required, or where it is desired to lessen pain, allay nervous excitability, procure sleep, and keep up a determination to the skin. One teaspoonful in some warm herb tea, repeated every hour, aided by warm infusions and bathing the feet, will soon produce copious diaphoresis. In pleurisy, a much larger dose may be given. In other cases it may be given in doses of from ten to sixty drops. It will be found beneficial in after-pains, painful dysmenorrhea, amenorrhea from recent exposure to cold, cramp in the stomach, hysteria, in all fevers and inflammatory diseases, etc. The tincture can not well be made by percolation.

TINCTURA STILLINGIÆ. *Tincture of Queen's Root.*

Preparation.—Take of the recent Queen's Root, cut into small pieces and bruised, *three ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This tincture possesses the virtues of the root, and may be used as a substitute for it in scrofulous, syphilitic, and rheumatic diseases. It is likewise beneficial in laryngeal, bronchial, and all pulmonary affections. The dose is from ten to thirty, or even sixty drops, to be administered in sweetened water. It may likewise be advantageously added to alterative syrups or tinctures.

TINCTURA STRAMONII. *Tincture of Stramonium.*

Preparation.—Take of Stramonium Seed, bruised, *two ounces;* Diluted Alcohol *one pint.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—This preparation may be administered wherever stramonium is indicated. The dose is from five to forty drops, repeated every three or four hours, gradually increasing it, if necessary.

TINCTURA STRYCHNIÆ COMPOSITA. *Compound Tincture of Strychnia.*

Preparation.—Take of Strychnia, in crystals, *sixteen grains;* Distilled Water, Alcohol, each, *seven fluidounces and a half;* Acetic Acid, Compound Tincture of Cardamon, each, *half a fluidounce.* Dissolve the Strychnia in the Alcohol and Acetic Acid mixed together, and then add the remaining articles.

Properties and Uses.—This tincture is useful in impaired spinal energy, or spinal exhaustion, whether the result of excessive study, muscular effort, sexual indulgence, masturbation, etc.; it is likewise efficacious in paralysis, constipation, debility of the generative organs, malarious diseases, chronic splenitis, and recent diseases of the prostate gland. It is contra-indicated in irritation of the spinal nerve. Two fluidrachms of the tincture contain one-eighth of a grain of strychnia. The dose is from ten to thirty drops, three times a day.

TINCTURA SYMPLOCARPI. *Tincture of Skunk Cabbage.*

Preparation.—Take of Skunk-Cabbage Root, in powder, *three ounces;* Diluted Alcohol *one pint.—Beachs' Am. Prac.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make one pint of tincture.

Properties and Uses.—Tincture of Skunk Cabbage is antispasmodic, and will be found useful in asthma, pertussis, hysteria, and other spasmodic affections; it is also beneficial in irritable, or excitable conditions of the nervous system. The dose is from a fluidrachm to half a fluidounce, repeated as often as required.

TINCTURA TOLUTANA. *Tincture of Tolu.*

Preparation.—Take of Balsam of Tolu *one ounce and a half;* Alcoho *one pint.* Digest until the Balsam is dissolved, and filter.—*Ed.*

Properties and Uses.—This tincture possesses the properties of balsam of tolu, and may be used in cough, and chronic catarrhal diseases; also as an adjunct to cough and expectorant compounds. The dose is from half a fluidrachm to one or two fluidrachms.

TINCTURA TOXICODENDRI. *Tincture of Poison Oak.*

Preparation.—Take of fresh Leaves of Poison Oak *four ounces;* Alcohol *three fluidounces.* Macerate for fourteen days, express, and filter under cover.

Properties and Uses.—This tincture may be used for all the purposes for which the poison oak is given, in the dose of from three to ten drops, in water. It should be kept in vials well stopped, as its active principle becomes dissipated on exposure. It must be used with great care.

TINCTURA VALERIANÆ AMMONIATA. *Ammoniated Tincture of Valerian.*

Preparation.—Take of Valerian, bruised, *four ounces;* Aromatic Spirit of Ammonia *two pints.* Macerate for fourteen days, express, and filter through paper. Or, prepare by Displacement, as explained on page 1293.

Properties and Uses.—This forms an excellent antispasmodic in hysterical and nervous attacks, especially when attended with gastric acidity; the dose is a fluidrachm or two, in mucilage, milk, or some sweetened fluid.

The AROMATIC SPIRIT OF AMMONIA (*Spiritus Ammoniæ Aromaticus*), is antacid, stimulant, and aromatic; and is used in sick headache, hysteria, flatulent colic, fainting, etc., in doses of from thirty to sixty drops, or more, in sweetened water. It is made as follows: Take of Muriate of Ammonia *five ounces;* Carbonate of Potassa *eight ounces;* Cinnamon, Cloves, each, bruised, *two drachms;* Lemon Peel *four ounces;* Alcohol, Water, each, *five pints.* Mix them, and distill off seven pints and a half. *Lond.*

TINCTURA VERATRI VIRIDIS. *Tincture of American Hellebore.*

Preparation.—Take of the fresh Roots of American Hellebore, gathered soon after the decay of the leaves in autumn, *eight ounces.* Slice them transversely, and macerate for two weeks in Diluted Alcohol *two pints.* Express, filter, and keep in well-stopped bottles.

Properties and Uses.—For these see pages 946–8.

TINCTURA VIBURNI COMPOSITA. *Compound Tincture of High-Cranberry Bark.*

Preparation.—Take of High-Cranberry Bark, in powder, *two ounces;* Lobelia Seed, in powder, Skunk-Cabbage Seed, bruised, each, *one ounce;* Stramonium Seed, bruised, Capsicum, Bloodroot, each, in powder, *half an ounce;* Alcohol *four pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make four pints of tincture.

Properties and Uses.—This tincture is stimulant and antispasmodic, and will be found efficacious in asthma, hysteria, and all nervous and spasmodic diseases. I have effected many cures of asthma (uncomplicated) with this remedy. The dose is from twenty to sixty drops, three times a day; or, during a paroxysm, as often as required.—*J. K.*

TINCTURA XANTHOXYLI. *Tincture of Prickly-Ash Berries.*

Preparation.—Take of Prickly-Ash Berries *eight ounces;* Diluted Alcohol *two pints.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Properties and Uses.—This tincture possesses all the virtues of the berries. (*See Prickly-Ash Berries, p.* 968, *Part I.*) In cholera, the dose is from half a fluidounce to a fluidounce, repeated as often as required, in ordinary cases, from one to four fluidrachms, given in water. Probably a tincture of the oil of the berries will effect the same results.

TINCTURA ZINGIBERIS. *Tincture of Ginger.*

Preparation.—Take of Ginger, bruised, *eight ounces;* Alcohol *two pints.* —*Dub.* Form into a tincture by Maceration or Displacement, as explained on page 1293, and make two pints of tincture.

Good Jamaica Ginger is required in preparing this tincture.

Properties and Uses.—Tincture of Ginger is an aromatic carminative, and may be added to tonic, purgative, and aromatic preparations with advantage. It may be used in flatulency, torpor of the digestive organs, and in debilitated conditions of the alimentary canal. The dose is from ten to sixty drops in sweetened water, milk, wine, or mucilage, as the indications will allow. Its chief use is in the preparation of syrup of ginger.

TROCHISCI.

Troches.

Troches or lozenges are medicinal substances in powder, which are formed into solid cakes, by the aid of sugar and gum. These cakes are circular, flat, a line or so in thickness, and about half an inch in diameter. They are usually intended for gradual solution while retained in the mouth, and form a very pleasant mode of exhibiting many useful remedies. Gum Arabic and tragacanth are both employed, but the latter is preferred on account of the greater cohesiveness of its gum. In preparing troches, the best tragacanth should be selected, and placed in sufficient cold water to form a mucilage of the consistence of paste; this must be strained previous to using it. The medicinal powders having been well incorporated with the sugar, are, by means of a sufficient quantity of the mucilage of tragacanth, worked into a soft dough, upon a plate of marble or porcelain. After all have been duly incorporated, the thick paste or dough is rolled out on the marble plate, its adhesion to the roller being prevented by sprinkling over it from time to time, some powdered starch, or a powder of starch and sugar. Uniformity of thickness is effected by the use of a frame of wood or iron, which is placed upon the marble plate, and upon which the extremities of the roller move during the process of rolling. The rolled out or extended layer of dough is now sprinkled with some of the powdered starch, and the troches are cut of the required shape and size by means of a tin plate punch. The troches are then placed on a sieve, and dried in a drying room or closet, after which the superfluous powder is removed by means of the sieve, and the troches placed in well covered bottles.—*Mohr and Redwood's Pharmacy.*

"Lozenges are frequently composed of extract of liquorice and gum Arabic with sugar, which renders them quite tough, so as to become unmanageable by long standing. In such cases the best mode is to thoroughly mix the articles together, and then add the sugar, in the form of a dense syrup, made with but two-thirds of the usual quantity of water required for simple syrup, mix it quickly, and while yet warm, roll the mass into long cylinders, and when nearly dry, cut them of the required size."—*W. Procter, jr.*

TROCHISCI ACIDI TARTARICI. *Troches of Tartaric Acid.*

Preparation. Take of Tartaric Acid *a drachm;* Refined Sugar *four ounces;* Oil of Lemons *ten minims;* Mucilage of Tragacanth *a sufficient quantity.* Pulverize the Sugar and Acid, add the Oil, mix them thoroughly, and with the Mucilage beat them into a proper mass for making lozenges of ten grains each.—*Ed.*

Troches of Citric Acid, are made in the same manner, substituting Citric Acid for the Tartaric.

Properties and Uses.—These lozenges are cooling and demulcent, useful in coughs, colds, slight febrile attacks, etc. They must not be used too freely as they will disorder and oppress the stomach.

TROCHISCI CAPSICI. *Troches of Capsicum.*

Preparation.—Take of Capsicum, in powder, *half an ounce:* Sugar *six ounces;* Mucilage of Gum Tragacanth *a sufficient quantity.* Mix the Sugar and Capsicum thoroughly together, and with the Mucilage beat them into a proper mass for making two hundred and forty lozenges.

Properties and Uses.—These troches will be found useful in dryness and irritation of the throat, relaxed uvula, and in all cases where capsicum is indicated. Each troche contains one grain of capsicum.

TROCHISCI CAPSICI ET LOBELIÆ. *Troches of Capsicum and Lobelia.*

Preparation.—Take of Capsicum, in powder, *half an ounce;* Oil of Lobelia *twenty-four minims;* Sugar *six ounces;* Mucilage of Tragacanth *a sufficient quantity.* Mix the Sugar and Capsicum thoroughly together, add the Oil, and with the Mucilage beat them into a proper mass for making two hundred and forty lozenges.

Properties and Uses.—These troches are stimulant and expectorant, and may be employed wherever such a combination is desired. Each troche contains one grain of capsicum, and one-tenth of a minim of oil of lobelia.

TROCHISCI CROTONIS. *Troches of Croton Oil.*

Preparation.—Take of Croton Oil *five minims;* Starch *one scruple;* Sugar *one drachm;* Chocolate *two drachms.* Mix the Oil with the solid ingredients in powder, and add a sufficient quantity of Water to form a mass of proper consistence, for thirty lozenges.

Properties and Uses.—These lozenges are cathartic; each lozenge contains one-sixth of a minim of croton oil.

TROCHISCI DIOSCOREINI. *Troches of Dioscorein.*

Preparation.—Take of Dioscorein *one ounce;* Ginger *half an ounce;* Oil of Peppermint *twenty-four minims;* Sugar *six ounces;* Mucilage of Tragacanth *a sufficient quantity.* Mix the Sugar, Dioscorein and Ginger thoroughly together, add the Oil, and with the Mucilage beat them into a proper mass for making two hundred and forty lozenges.

Properties and Uses.—These troches are useful in cases of colic, flatulency, borborygmi, and to cure as well as prevent a return of bilious colic. Each troche contains two grains of dioscorein.—*J. K.*

TROCHISCI GLYCYRRHIZÆ ET OPII. *Troches of Liquorice and Opium. Wistar's Cough Lozenges.*

Preparation.—Take of powdered Opium *one drachm;* powdered Liquorice *three ounces;* powdered Gum Arabic *two ounces and a half;* powdered White Sugar *two ounces.* Triturate these thoroughly together, with Oil of Anise *twenty minims*, and finally add *a sufficient quantity* of Water to form a mass of the proper consistence. Divide into troches of five or six grains each.

Properties and Uses.—These lozenges are a soothing and lenitive preparation for catarrhs and tickling coughs, in cases where opium is not contra-indicated. Ten lozenges contain one grain of opium.

TROCHISCI GLYCYRRHIZÆ COMPOSITA. *Compound Troches of Liquorice.*

Preparation.—Take of Muriate of Ammonia, in powder, *one drachm and a half;* Muriate of Morphia *six grains;* Gum Arabic, Sugar, Extract of Liquorice, each, in powder, *seven drachms;* Oil of Sassafras *thirty minims;* Oil of Stillingia *twenty minims;* Tincture of Balsam of Tolu *three fluidrachms.* Mix the powders thoroughly together, then add the Oils and Tincture, and with Water form them into a mass, to be divided into one hundred and eighty troches.

Properties and Uses.—These troches are very valuable in cough, irritation or tickling of the throat, laryngitis, and bronchitis. Each troche contains the one-twentieth of a grain of morphia.—*J. K.*

TROCHISCI IPECACUANHÆ. *Troches of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, in powder, *one drachm;* Elecampane, in powder, *one ounce;* Sugar, in powder, *ten ounces.* Triturate these powders thoroughly together, with Oil of Anise *half a fluidrachm*, and then combine them with Mucilage of Tragacanth *a sufficient quantity* to form a mass of proper consistence. Divide into troches of ten or twelve grains each.

Properties and Uses.—These troches are expectorant, and will be found valuable in coughs, catarrhs, etc. Four lozenges contain about one grain of ipecacuanha.

TROCHISCI MAGNESIÆ. *Troches of Magnesia.*

Preparation.—Take of Carbonate of Magnesia *three ounces;* powdered White Sugar *one pound;* Ginger, in powder, *a drachm.* Triturate the powders thoroughly together, and then combine them with Mucilage of Tragacanth *a sufficient quantity* to form a mass of proper consistence. Divide into troches of eight or ten grains each.

Properties and Uses.—These are antacid and laxative, and may be used in cases of gastric acidity, and costiveness.

TROCHISCI MENTHÆ PIPERITÆ. *Troches of Peppermint.*

Preparation.—Take of Oil of Peppermint *half a fluidounce;* finely powdered White Sugar *four pounds.* Triturate the Oil and Sugar thoroughly together, and then add Mucilage of Tragacanth in sufficient quantity to form a mass of proper consistence. Divide into troches of eight or ten grains each.

Properties and Uses.—These are carminative and antispasmodic, and will be found useful in sick stomach, slight pains in the stomach or bowels, flatulency, and griping from purgative medicines. If eaten too freely they cause derangement of the stomach.

TROCHISCI PODOPHYLLINI. *Troches of Podophyllin.*

Preparation.—Take of Podophyllin *one scruple;* Leptandrin *four scruples;* Oil of Sassafras *a fluidrachm;* Sugar *six ounces;* Mucilage of Tragacanth *a sufficient quantity.* Rub the Sugar, Podophyllin, and Leptandrin together until they are thoroughly mixed, then add the Oil, and with the Mucilage beat them into a proper mass for four hundred and eighty lozenges.

Properties and Uses.—Cholagogue, alterative, and purgative. Patients laboring under constipation, hepatic torpor, dysentery, or other diseases in which the above combination is desired or indicated, may use several of these troches a day, according to the effects which they produce. Each troche contains one twenty-fourth of a grain of podophyllin, and one-fifth of a grain of leptandrin; in ordinary cases, twelve troches used per day, will maintain regularity of the bowels. If it be desired to have these lozenges more active, two or three scruples of podophyllin may be added for the same number.

TROCHISCI RHEI ET POTASSÆ. *Troches of Rhubarb and Potassa.*

Preparation.—Take of Rhubarb, in powder, *two ounces;* Bicarbonate of Potassa *one ounce;* Oil of Peppermint *a fluidrachm;* Sugar *twelve ounces;* Mucilage of Tragacanth *a sufficient quantity.* Rub the Rhubarb, Sugar, and Potassa thoroughly together, then add the Oil, and with the Mucilage beat them into a proper mass for five hundred lozenges.

Properties and Uses.—These troches may be used by persons subject to, or laboring under diarrhea, dysentery, cholera-morbus, acidity of stomach, heartburn, etc. They will also prove tonic in small quantity. From six to twelve may be used daily. Each troche contains nearly two grains of rhubarb.

TROCHISCI SODÆ BICARBONATIS. *Troches of Bicarbonate of Soda.*

Preparation.—Take of Bicarbonate of Soda *three ounces;* Ginger, in powder, *a drachm;* powdered White Sugar *one pound.* Triturate these articles thoroughly together, and then combine them with Mucilage of Tragacanth *a sufficient quantity* to form a mass of proper consistence. Divide into troches of ten or twelve grains each.

Properties and Uses.—These are antacid, and will be found useful in heartburn, especially during pregnancy, in acid stomach, and in urine containing excess of uric acid.

TROCHISCI STILLINGIÆ COMPOSITA. *Compound Troches of Stillingia.*

Preparation.—Take of Oil of Stillingia *one fluidrachm;* Oil of Prickly-Ash Berries, Oil of Sassafras, each, *four fluidrachms;* Sugar *ten ounces;* Mucilage of Gum Tragacanth *a sufficient quantity.* Rub the Oils with the Sugar until they are thoroughly mixed; then with the Mucilage form them into a mass to be divided into four hundred and eighty lozenges.

Properties and Uses.—These troches form a very agreeable remedy for rheumatic, syphilitic, scrofulous, bronchial, and laryngeal affections, and may be used somewhat freely by patients thus afflicted. Eight lozenges contain one minim of oil of stillingia, and the quantity used per day must be regulated according to their influence on the stomach and bowels. They will likewise be found beneficial in chronic affections of the mucous membranes.—*J. K.*

TROCHISCI ZINGIBERIS. *Troches of Ginger.*

Preparation.—Take of Good Jamaica Ginger, in powder, *one ounce;* Sugar *seven ounces;* Mucilage of Tragacanth *a sufficient quantity.* Mix the Sugar and Ginger thoroughly together; then with the Mucilage form them into a mass to be divided into lozenges of fifteen grains each.

Properties and Uses.—These form a grateful cordial stimulant, and may be used in cases of flatulence, debility of the stomach, etc.

UNGUENTA.

Ointments.

Ointments are fatty matters, containing the properties of certain medicines, and are designed for external use; their consistence is somewhat like that of good lard, and not being softened by warm weather, so that they can be well rubbed upon the skin. They are most commonly prepared with lard, which should be entirely free from salt or rancidity; sometimes fresh butter is employed. Lard may be prepared for this purpose, by melting it in twice its quantity of boiling water, stirring the mixture constantly; then setting it aside to cool, and separating the lard when it has solidified.—*Dub.* This forms prepared lard.—(*Adeps Suillus Præparatus.*) Substances entering into the formation of ointments, and which are not soluble in the fatty matter, should be reduced to a very fine powder previous to incorporation with it; or if they are dissolved in alcohol or water, as hard extracts, etc., they may be first softened by trituration with a small quantity of one of these solvents. When ointments are long kept they are very apt to become rancid, hence it is usually preferable to make up only small portions at a time, or whenever required for use. Either benzoic acid, or poplar buds, if not objectionable, or incompatible with the ointment, will when added to it, prevent, in a great degree the disposition to rancidity. The greasy odor of ointments, may be removed by triturating each ounce of ointment with ten drops of sweet spirits of nitre; it also prevents and removes rancidity in oils, and when the oil is heated to remove the nitre, it becomes clear and bright. According to Dr. C. W. Wright, fats and fixed oils may be preserved free from rancidity and disagreeable odor for a long time, by melting them with powdered slippery-elm, in the proportion of one drachm of the bark to a pound of the fat; after ten or fifteen minutes' application of heat, the fat must be strained off. The elm-bark communicates an odor to the fat, that is scarcely distinguishable from that of the kernel of the hickory-nut. Wild states that rancidity in butter may be removed by kneading the butter first with fresh milk and then with pure water; the butter is rendered as fresh and pure in flavor as when recently made. Prof. E. S. Wayne recommends paraffin as a substitute for lard; it might be added to lard, if some third body could be found which would prevent their separation on cooling, or it could be used alone.

M. L. Hermite proposes as a substitute for the oleaginous and glycerinic solutions of the alkaloids, solutions of these bases in *oleic acid.* He objects to the oils from their incapability of dissolving the alkaloids, and to the glycerin from its not possessing unctuous properties. Oleic acids triturated with the alkaloids, dissolve them and their salts perfectly, and may then be perfumed. *Oleate of Morphia.*—A grain and a half of powdered morphia, an ounce of pure oleic acid, and six drops of essence of bergamot. *Oleate of Quinia.*—A drachm of powdered sulphate of quinia to ten drachms of aromatized oleic acid; dissolved by the aid of a gentle heat. *Oleate of Veratria.*—Six grains of powdered veratria dissolved in an ounce of oleic acid. *Oleate of Atropia*, or of *Strychnia.*—Three to fifteen grains of atropia, or strychnia, dissolved in ten drachms of oleic acid.—(*See page* 830.) These oleates will serve for the preparation of ointments, solidifying them with stearic acid (such as used for candles), or a mixture of stearic and margaric acids; these acids will also dissolve the vegetable bases when heated. Thus: *Oleic Ointment of Quinia.*—Take of sulphate of quinia a drachm, oleic acid seven drachms and a half, stearic acid (of candles) two and a half drachms; fuse and dissolve. *Oleic Ointment of Veratria.*—Take of veratria six grains, oleic acid six drachms, stearic acid two drachms; mix and dissolve, etc. Oleic acid is also a good solvent for resinous matters and the volatile oils.—*Am. Jour. Pharm., XXVII.*, 72.

G. F. Schacht has proposed glycerin as a substitute for oils and fats in ointments, terming the compounds thus formed "Plasmas." The proportions he employs as a basis are glycerin one fluidounce, starch powder seventy grains, and the entire process consists in mixing the ingredients cold, and heating the mixture gradually to about 240° F., constantly stirring. Thus a *Plasma of Iodide of Potassium* may be made by dissolving two drachms of iodide of potassium in two fluidounces of glycerin, mixing in starch powder one hundred and forty grains, and heating to 240° F., as above. *Plasma Petrolei* for cutaneous diseases, made by triturating starch powder seventy grains with petroleum one drachm till quite smooth, then add gradually glycerin one fluidrachm, and heat to 240° F., as above.

Previous to Schacht's proposal, Mr. Startin recommended glycerin in combination with amylaceous substances as a basis for ointments, but he has discontinued their use. One of his formulæ was Tragacanth *two drachms*, Glycerin *half an ounce*, Lime-water *one ounce*, Rose-water *enough* to form a soft jelly. For these purposes, pure glycerin should be used, free from acid, chlorine, lead, or water; the best is that produced in the manufacture of lead plaster of sp. gr. 1.26.—*Pharm. Jour. and Trans. XVII.*, 400.

Mr. H. Seymour proposes two formulæ for similar purposes to the above, as a basis for ointments, viz.: 1. Take of Fuller's earth *half an ounce*, Palm Oil *two drachms*. 2. Take of Fuller's earth *half an ounce*, Oil of Almonds *two fluidrachms*, Water *two fluidrachms*, Glycerin *one fluidrachm*.

UNGUENTUM ACIDI MURIATICI. *Ointment of Muriatic Acid.*

Preparation.—Take of Muriatic Acid *one fluidrachm;* Spermaceti Ointment *one ounce*. Mix together in a glass or porcelain mortar.

Properties and Uses.—This ointment is used in scald-head, to be applied night and morning, after the scabs have been removed by a poultice.—*Corrigan.*

UNGUENTUM ACIDI NITRICI. *Ointment of Nitric Acid.*

Preparation.—Take of Olive Oil *one ounce;* Prepared Lard *two drachms;* Nitric Acid *ten minims.* Melt the Oil and Lard together in a glass vessel, and when they begin to congeal, add the acid, stirring the mixture constantly with a glass rod until it stiffens.—*Dub.*

Properties and Uses.—This ointment is used in syphilitic ulcers, eruptive affections, and fistula in ano.

UNGUENTUM ACIDI SULPHURICI. *Ointment of Sulphuric Acid.*

Preparation.—Take of Sulphuric Acid *one fluidrachm;* Prepared Lard *one ounce.* Mix together in a glass or porcelain mortar.

Properties and Uses.—Used in ringworm, itch, and other cutaneous diseases, also in rheumatism and neuralgia.—*Brugnatelli.*

UNGUENTUM ACIDI TANNICI. *Ointment of Tannic Acid.*

Preparation.—Take of Tannic Acid *two drachms;* Lard *two ounces.* Triturate them well together.

Properties and Uses. — Astringent and antiseptic. Useful in piles, ulcers, some forms of cutaneous disease, and where such indications are required.—*Beral.*

UNGUENTUM ACONITI. *Ointment of Aconite.*

Preparation.—Take of Alcoholic Extract of Aconite *one drachm;* Lard *two drachms.* Soften the extract with a small quantity of Alcohol, if necessary, and mix with the Lard. *See Stramonium Ointment.*

Properties and Uses.—This ointment is used in violent neuralgic and rheumatic pains.—*Turnbull.*

UNGUENTUM ALKALINUM. *Alkaline Ointment.*

Preparation.—Take of Carbonate of Soda *two drachms;* Tincture of Opium *one fluidrachm;* Lard *one ounce.* Rub together in a porcelain or wedgewood mortar.

Properties and Uses.—This is used in several forms of cutaneous disease, as lichen, lepra, psoriasis, ichthyosis, porrigo favosa, etc.—*Souberain.*

UNGUENTUM ALKALINUM CAMPHORATUM. *Camphorated Alkaline Ointment.*

Preparation.—Take of Carbonate of Potassa *one scruple;* Camphor *six grains;* Lard *seven drachms.* Rub together in a mortar.

Properties and Uses.—This ointment is used in sycosis, and several forms of cutaneous disease.—*Cazenave.*

UNGUENTUM AMMONIACALE. *Ammoniacal Ointment. Pommade de Gondret.*

Preparation.—Take of Lard *six drachms;* Suet *four drachms;* Almond Oil *two drachms;* Stronger Solution of Ammonia *twelve fluidrachms.* Melt the Lard, Suet, and Oil together, then add the Ammonia, and shake the whole together in a close bottle.

Properties and Uses.—This preparation is rubefacient, and vesicant; to procure its vesicating influence, it must be covered with a compress after inunction.

UNGUENTUM AQUÆ ROSÆ. *Ointment of Rose Water. Cold Cream.*

Preparation.—Take of Spermaceti *half an ounce;* Glycerin *four fluidrachms;* Oil of Almonds *two fluidounces;* White Wax *a drachm;* Oil of Roses *three drops.* Melt together, by means of a water-bath, the Spermaceti, Oil of Almonds, and Wax; then add the Glycerin, in which the Oil of Roses has been placed, and stir constantly until cold. The glycerin will only unite mechanically with the other articles.—*J. Laidley.*

Properties and Uses.—This is a delightful cooling ointment much employed as an application to irritated, chapped, and abraded surfaces, as chapped lips, hands, etc. It was formerly made of White Wax *one part;* Spermaceti *four parts;* Rose-water *eight parts;* Oil of Almonds *sixteen parts;* but on account of its tendency to decomposition and rancidity, the preceding formula is preferred.

UNGUENTUM BAPTISIÆ. *Ointment of Wild Indigo.*

Preparation.—Take of Wild-Indigo Root *twenty pounds;* Fresh Butter *ten pounds;* Beeswax *three pounds;* Tallow *one pound and a half;* Diluted Alcohol *a sufficient quantity.* Macerate the Root, in powder, in Diluted Alcohol for forty-eight hours; then transfer it to a percolator, and gradually pour upon it Diluted Alcohol until the liquid passes nearly tasteless. Add the filtered liquor to the other ingredients, and carefully digest with heat, until the Alcohol and Water have evaporated; then strain the mixture.—*Beach's Am. Prac.*

Properties and Uses.—This ointment is cleansing, detergent, discutient, antiseptic, etc. It is useful in many cutaneous affections, erysipelas, scrofulous, gangrenous, and all other forms of ulcer, piles, etc.

UNGUENTUM BELLADONNÆ. *Ointment of Belladonna.*

Preparation.—Take of Extract of Belladonna *two drachms;* Lard, or Simple Cerate *one ounce.* Mix them.—*Lond. See Stramonium Ointment.*

Properties and Uses.—This forms an anodyne application, and may be advantageously applied in local neuralgia, to painful joints, to dilate the pupil, and also the os uteri, and to the denuded spine in violent tetanus, delirium-tremens, and puerperal convulsions.

The *Unguentum Atropiæ,* for similar purposes, is made by triturating Atropia *five grains,* with Lard *three drachms.* It must be used with caution, and not be applied on abraded surfaces.

UNGUENTUM BENZOINI. *Ointment of Benzoin.*

Preparation.—Take of Benzoin, in coarse powder, *one ounce;* Fresh Lard *twenty-five ounces.* Heat together for two or three hours in a water-bath, and then strain.—*Deschamps.*

Properties and Uses.—This forms an excellent basis for ointments, as benzoin resists rancidity, and the decomposition of metallic salts and oxides. Poplar buds have the same effect.

UNGUENTUM CANTHARIDIS. *Ointment of Spanish-flies.*

Preparation.—Take of finely powdered Spanish-flies, Olive Oil, each, *three ounces;* Oil of Turpentine *one fluidounce and a half;* Yellow Wax, Resin, each, *two ounces;* Mix the Flies, Olive Oil, and Turpentine, place them in a vessel on a water-bath, and continue the heat until the Turpentine has nearly evaporated, stirring the mixture occasionally. Then add the Wax and Resin previously melted together, and heat till the articles are thoroughly incorporated; remove from the bath, and stir till cold.—*W. Procter, jr.*

Properties and Uses.—This is used not for the purpose of causing vesication, but as a stimulating dressing to blisters, whenever such is desirable.

UNGUENTUM CETACEI. *Spermaceti Ointment.*

Preparation.—Take of Spermaceti *six drachms;* White Wax *two drachms;* Olive Oil *three fluidounces.* Melt the articles together over a slow fire, and stir them constantly until cold.—*Lond.*

Properties and Uses.—This is a mild emollient ointment, employed as a dressing for excoriations, wounds, vesicated surfaces, etc. Owing to its disposition to rancidity, but a small quantity should be prepared at a time.

UNGUENTUM COCCULI. *Ointment of Cocculus Indicus.*

Preparation.—Take of the kernels of Cocculus Indicus *two ounces;* Lard *ten ounces.* Beat the kernels well in a mortar, first alone, and then with a little of the Lard; and then gradually add the rest of the Lard. —*Ed.*

Properties and Uses.—This ointment is employed in the treatment of itch, and porrigo scutulata, as well as an application to destroy lice. An ointment composed of picrotoxin one grain, lard forty-eight grains, is used for similar purposes.

UNGUENTUM CONII. *Ointment of Poison Hemlock.*

Preparation.—Take of fresh Hemlock Leaves, Lard, each, *one pound;* Wax *two ounces;* Spirits *one pint.* Slowly simmer together, until the Leaves become crisp, and then express through linen.—*Lond.*

Properties and Uses.—This is a mild anodyne. Useful as an application to foul, painful, and cancerous sores, to glandular and scirrhous enlargements, and to painful hemorrhoids.—*P.*

The addition of *one drachm* of the Extract to *one ounce* of Lard, makes a more efficient preparation, as the heat employed in the preparation of the first formula, probably, impairs the virtues of the hemlock.

UNGUENTUM CREASOTI. *Ointment of Creasote.*

Preparation.—Take of Creasote *half a fluidrachm;* Lard *one ounce.* Rub them together.—*Lond.*

Properties and Uses.—This ointment is used in some cutaneous diseases, porrigo of the scalp, and as an antiseptic and stimulant to indolent or gangrenous ulcers.

UNGUENTUM CUCUMIS. *Ointment of Cucumber.*

Preparation.—Take of Green Cucumbers (suitable for table use) *seven pounds;* Pure White Lard *twenty-four ounces;* Selected Veal Suet, cut in pieces, *fifteen ounces.* The unpared Cucumbers, after being washed, are to be reduced to a pulp by grating, and the juice expressed and strained. The Suet is to be heated over a salt-water bath, until the fat is fused out from the membranes; then add the Lard, and when liquefied, strain the mixture through muslin into a wide-mouthed earthen vessel capable of holding a gallon, and stir it until it commences to thicken, when one-third of the Cucumber-juice is to be added and beaten with the ointment, by means of a wooden spatula, until its odor has been almost wholly extracted, and which will require several hours. Then allow it to stand until the fluid separates, which must be removed by decantation, and add another third of the juice. This must be beaten in like manner until exhausted, then decanted, and finally the last third added, and similarly treated. The jar is then to be closely covered and placed in a water-bath, where it must remain an hour, or until the fatty matter entirely separates from the exhausted juice. The green albuminous coagulum which floats upon the surface is then to be skimmed off, and the jar put aside in a cool place that the ointment may solidify. The crude ointment is then to be carefully separated from the watery liquid on which it floats, melted by a gentle heat, and strained—a part into a jar and closely sealed for keeping—the remainder into a mortar, and triturated with a little rose-water, until it is very white and creamy, for present use. It is usual to keep this ointment in glass jars without allowing any unfilled interstices, and to cover it with rose-water to prevent the access of air. Thus prepared Cucumber Ointment readily keeps from season to season.—*W. Procter, Jr.*

Properties and Uses.—This forms an emollient application, very useful for chapped lips and hands, irritated and excoriated surfaces, etc.

UNGUENTUM FULIGINIS. *Ointment of Wood-soot.*

Preparation.—Take of Wood-soot, in very fine powder, *half an ounce;* Lard *two ounces.* Triturate them together.—*Souberain.*

Properties and Uses.—Applied on cotton batting this ointment is very useful in burns and erysipelatous inflammations; and is also beneficial in tinea-capitis and several cutaneous diseases.

UNGUENTUM GALLÆ. *Ointment of Galls.*

Preparation.—Take of Galls, in powder, *one ounce;* Ointment of White Wax *seven ounces.* Triturate them together.—*Dub.*

Properties and Uses.—This ointment is useful in falling of the bowels, external hemorrhoidal swellings, and foul, obstinate ulcers. When the piles are irritable, half a drachm of pulverized opium may be advantageously added.

UNGUENTUM IODINII COMPOSITUM. *Compound Ointment of Iodine.*

Preparation.—Take of Iodine *one drachm;* Iodide of Potassium *two drachms;* Lard *four ounces;* Alcohol *two fluidrachms.* Triturate the Iodine and Iodide with the Alcohol, and add gradually the Lard, and make an ointment.—*Lond.*

Properties and Uses.—This preparation is used as a local application, in bronchocele, scrofulous, and other chronic glandular enlargements, and in opacities of the cornea; it is undoubtedly absorbed, and thus effects its influence; the discoloration of the skin occasioned by its use gradually disappears. Applied twice a day to enlarged tonsils, by means of a camel's-hair pencil, it has caused the enlargement to disappear in the course of two months. It is better to prepare it only as it is required for use.

UNGUENTUM IPECACUANHÆ. *Ointment of Ipecacuanha.*

Preparation.—Take of Ipecacuanha, in powder, *two drachms;* Olive Oil *two fluidrachms;* Lard *half an ounce.* Mix together.

Properties and Uses.—Rubbed on the skin for a few minutes, once or twice a day, this ointment produces an eruption. It is used as a counter-irritant in diseases of the throat, and in pulmonary affections is applied to the chest. When it is desired to make it more active, Croton Oil *a fluidrachm and a half* may be added to the above formula. If rubbed on the surface for twenty or thirty minutes at a time, repeated three or four times a day, and covered with flannel after each application, it will produce vesicles in thirty-six hours.

UNGUENTUM MEZEREI. *Ointment of Mezereon.*

Preparation.—Take Extract of Mezereon *half a drachm;* Alcohol *half a fluidounce;* White Wax *half an ounce;* Lard *four and a half ounces.* Dissolve the Extract in the Alcohol, then add the Wax and Lard, previously melted together, and continue the heat to evaporate the Alcohol; strain while hot, and keep stirring till cold.—*Guibourt.*

Properties and Uses.—This is an irritant, and is applied to obstinate ulcers, wounds, etc., to excite suppuration; sometimes, it is used to keep up the discharge from vesicated surfaces.

UNGUENTUM MYRICÆ. *Ointment of Bayberry.*

Preparation.—Take of Bayberry Tallow, White Turpentine, each, *two ounces;* Olive Oil *one ounce.* Melt together and strain.—*Beach's Am. Prac.*

Properties and Uses.—This forms an excellent application to scrofulous ulcers, and indolent ulcers generally.

UNGUENTUM MYRICÆ COMPOSITUM. *Compound Ointment of Bayberry.*

Preparation.—Take of Bayberry Tallow, Sweet Gum, each, *one ounce;* Suet *two ounces.* Melt together and strain.

Properties and Uses.—This ointment is very advantageous in scrofulous ulcers, tinea-capitis, porrigo scutulata, itch, salt-rheum, and several other forms of cutaneous disease; also in itch, piles, and fistulous ulcers. In fistula and some cutaneous diseases the addition of three or four drachms of sulphate of zinc, in powder, will be found beneficial.—*J. K.*

UNGUENTUM PHYTOLACCÆ. *Ointment of Poke.*

Preparation.—Take of the Leaves of Poke, collected just before the ripening of the berries, *four pounds;* Lard *one pound;* Spirits *one pint;* Wax *two ounces.* Mix, and slowly simmer together until the Leaves are crisp, and then express through linen.

An ointment is sometimes made by mixing *one drachm and a half* of the Powdered Poke Leaves or Root, or of the Extract of Poke, with *one ounce* of Lard.—*See Stramonium Ointment.*

Properties and Uses.—This is used as an application to ulcers, porrigo, tinea-capitis, and other cutaneous affections, and as a discutient to various tumors.

UNGUENTUM PICIS LIQUIDÆ. *Ointment of Tar.*

Preparation.—Take of Tar, Suet, each, *four ounces.* Melt them together and squeeze through a linen cloth.—*Lond.*

Properties and Uses.—This is a stimulating ointment. It is used principally in tinea-capitis, and ringworm of the scalp; being kept constantly applied to the part by means of a cap. It has also been efficacious in some other cutaneous diseases.

UNGUENTUM PIPERIS NIGRI. *Ointment of Black Pepper.*

Preparation.—Take of Prepared Lard *a pound;* Soot *four ounces;* Tar *one pint;* Black Pepper, in powder, *four ounces.* Melt the Lard and Tar together, then add the Soot and Pepper.

Properties and Uses.—This is used in tinea-capitis, in the same manner as the preceding ointment.

UNGUENTUM PLUMBI COMPOSITUM. *Compound Lead Ointment. Mayer's Ointment.*

Preparation.—Take of Olive Oil *two pounds and a half;* White Turpentine *half a pound;* Beeswax, Unsalted Butter, each, *four ounces;* Red Lead *one pound;* Honey *twelve ounces;* Powdered Camphor *half a pound.* Melt the Olive Oil, White Turpentine, Beeswax and Butter together, and strain; then heat them to nearly the boiling point, and gradually add the Red Lead, stirring the mixture constantly until it becomes black or brown. Then remove from the fire, and when it becomes somewhat cool, add to it the Honey and Camphor, previously mixed together.

Properties and Uses.—This forms a very beneficial ointment for all kinds of ulcers, cuts, wounds, and several cutaneous diseases. It is of a more solid consistence than ointments are generally. It is highly prized by the German population, who have held it for a long time as a secret among themselves. The profession are indebted to Mr. Jos. P. Mayer, of Cincinnati, for a knowledge of it.

UNGUENTUM POTASSII CYANURETI. *Ointment of Cyanuret of Potassium.*

Preparation.—Take of Cyanuret of Potassium *twelve grains;* Oil of Almonds *two drachms;* Cold Cream *two ounces.* Triturate together.

Properties and Uses.—This is used as an application to the sound skin, in neuralgia.—*Cazenave.*

UNGUENTUM POTASSII SULPHURETI. *Ointment of Sulphuret of Potassium.*

Preparation.—Take of Sulphuret of Potassium *three drachms;* Carbonate of Soda *three drachms;* Lard *three ounces.* Triturate thoroughly together.—*Alibert.*

Properties and Uses.—This ointment is useful in ringworm, itch, and other forms of cutaneous disease.

UNGUENTUM SCROPHULARIÆ. *Ointment of Figwort.*

Preparation.—Take of Fresh Figwort Leaves *two pounds;* Lard *one pound;* Tallow *half a pound.* Boil together until the Leaves are crisp, and then strain with expression.

Or, it may be made from the Extract, the same as explained under *Stramonium Ointment.*

Properties and Uses.—This ointment is useful in piles, painful tumors, ulcers, and cutaneous diseases; Dr. W. Stokes considers it a specific in gangrenous pemphigus.

UNGUENTUM SIMPLEX. *Simple Ointment. Ointment of White Wax.*

Preparation.—Take of White Wax *an ounce;* Lard *four ounces.* Melt together and strain.—*Dub.*

Properties and Uses.—This is an emollient ointment, employed as a mild and cooling dressing to ulcers, excoriations, blisters, etc. It enters into the formation of several ointments.

UNGUENTUM STRAMONII. *Ointment of Stramonium.*

Preparation.—Take of Extract of Stramonium *one drachm;* Alcohol *a fluidounce;* White Wax *half an ounce;* Lard *four and a half ounces.* Dissolve the Extract in the Alcohol, then add the Wax and Lard, previously melted together, and continue the heat to evaporate the Alcohol; strain while hot, and keep stirring till cold.

This ointment may likewise be made as follows, but the preparation is inferior to that made according to the formula just given: Take of fresh Stramonium Leaves, cut in pieces, *one pound;* Lard *one pound;* Yellow Wax *three ounces.* Boil together until the Leaves become crisp, and then strain with expression.

Properties and Uses.—This forms an anodyne ointment, which will be found serviceable in irritable ulcers, burns, scalds, irritable cutaneous diseases, painful hemorrhoids, and as a discutient to indolent tumors.

UNGUENTUM STRAMONII COMPOSITUM. *Compound Ointment of Stramonium. Discutient Ointment.*

Preparation.—Take of the Bark of the Root of Bittersweet, Stramonium Leaves, Cicuta Leaves, Deadly Nightshade, Yellow-Dock Root, each, *two ounces;* Lard *one pound;* Venice Turpentine *two ounces;* Spirits *a sufficient quantity.* Bruise the Roots and Leaves, cover them with Spirits, and allow them to digest with a moderate heat for four hours, then add the Lard and continue the heat until the Leaves are crisped. Lastly, strain and express through linen, add the Turpentine, and stir constantly till cold.—*Beach's Am. Prac.*

This ointment may likewise be made by mixing together, *two ounces* each, of the Ointments of the articles prepared separately, and the Turpentine. The Ointments to be prepared as follows: those of the Yellow-Dock Root, and Bittersweet Bark, to be made by beating each separate article in the recent state, with Lard, after the manner for preparing Cucumber Ointment; the remaining Ointments, each to be prepared from the extracts of the several articles, after the manner for preparing Stramonium Ointment.

Properties and Uses.—This ointment is useful to discuss tumors of various kinds; it must be well rubbed on the parts two or three times a day, covering them with cotton, held in place by a bandage, after each inunction.

UNGUENTUM SULPHURIS. *Ointment of Sulphur.*

Preparation.—Take of Sulphur *four ounces;* Lard *half a pound;* Oi of Bergamot *twenty minims.* Mix them.—*Lond.*

Properties and Uses.—Sulphur ointment is considered a certain cure for the itch. It must be applied over the whole surface of the body every night, until cured; it usually cures in four or five days; after which the body should be thoroughly washed with soap and water. It will also be found useful in tinea-capitis, crusta-lactea, and several other cutaneous diseases.

UNGUENTUM SULPHURIS COMPOSITUM. *Compound Ointment of Sulphur.*

Preparation.—Take of Sulphur *half a pound;* White Hellebore, in powder, *one ounce;* Nitrate of Potassa *a drachm;* Soft Soap *half a pound;* Poke Ointment *a pound and a half;* Oil of Bergamot *two fluidrachms.* Mix the articles thoroughly together.—*Lond.*

Properties and Uses.—This ointment is more irritating than the simple sulphur ointment; but, notwithstanding it will be found efficacious in the treatment of itch, especially when it proves very obstinate and unyielding to the milder treatment.

UNGUENTUM TABACI. *Ointment of Tobacco.*

Preparation.—Take of Extract of Tobacco *one drachm;* Alcohol *a fluidounce;* Yellow Wax *half an ounce;* Lard *four and a half ounces.* Dissolve the Extract in the Alcohol, then add the Wax and Lard, previously melted together, and continue the heat to evaporate the Alcohol; strain while hot, and keep stirring till cold.

Or, it may be prepared by taking the fresh Leaves of Tobacco *two pounds;* Lard *half a pound;* Spirits *half a pint;* and Wax *one ounce*, and proceeding in the same manner as explained for Ointment of Poke, on page 1333.

Properties and Uses.—Tobacco ointment forms an anodyne application, useful in various affections of the skin, piles, scald-head, irritable swellings, painful ulcers, etc. Some caution is necessary not to use it too freely, lest it produce its constitutional narcotic effects. An ointment made from the dried leaves is of but little value; one made by rubbing twenty drops of the empyreumatic oil of tobacco with an ounce of simple ointment, forms an active preparation.

UNGUENTUM VERATRI ALBI. *Ointment of White Hellebore.*

Preparation.—Take of Veratrum Album, the Root, in powder, *two ounces;* Lard *eight ounces;* Oil of Lemons *twenty minims.* Mix them together.—*Lond.*

Properties and Uses.—This ointment, being more agreeable than sulphur ointment, is sometimes employed in itch with benefit; but it should be cautiously applied to children. The substitution of poke ointment for the lard, will render it still more certain and effective.

UNGUENTUM VERATRIÆ. *Ointment of Veratria.*

Preparation.—Take of Veratria *ten* or *twenty grains;* Lard *an ounce.* Triturate the Veratria in a little Olive Oil, and then add the Lard.

Properties and Uses.—This forms a powerful local stimulant, very useful in neuralgia, amaurosis, and paralysis. It must be employed with care.

UNGUENTUM ZINCI OXIDI. *Ointment of Oxide of Zinc.*

Preparation.—Take of Oxide of Zinc *an ounce;* Lard *six ounces.* Mix them well together.—*Lond.*

Properties and Uses.—This forms a mild astringent ointment, useful in porrigo, impetigo, and other diseases of the skin, attended with profuse discharges; after extensive burns, blisters, sinapisms, etc.; to painful ulcers with excessive secretion, and to the eye when affected with chronic inflammation, etc.—*P.* Five or ten grains of benzoic acid added to an ounce of the ointment prevents it from becoming rancid. Mr. D. Kemp recommends the following formula, as giving a consistent and durable ointment, without requiring any unusual means to preserve it: Take of Prepared Lard, Pure Olive Oil, each, *two ounces;* White Wax, Spermaceti, Oxide of Zinc, each, *one ounce.* Melt the fats, oil, etc., in a water-bath at a low heat, strain into a very warm mortar, and just before cooling, add the Zinc, and continue the stirring very briskly till cold.

UNGUENTUM ZINCI OXIDI COMPOSITUM. *Compound Ointment of Oxide of Zinc.*

Preparation.—Take of Olive Oil *two pounds;* Spermaceti *twelve ounces;* White Wax *four ounces;* Oxide of Zinc *seven ounces;* Benzoic Acid *two drachms;* Sulphate of Morphia *forty-eight grains;* Oil of Roses *twenty minims.* Rub together in a mortar, until no specks are seen, the Oxide of Zinc, Benzoic Acid, Sulphate of Morphia, and Oil of Roses. Melt the Olive Oil, Wax, and Spermaceti together, and add the above triturated mass to it, stirring constantly till nearly cold.—*W. S. M.*

Properties and Uses.—This forms a mild stimulating and astringent preparation, which is exceedingly useful in acute and chronic ophthalmia, opacities of the cornea, nebula, granulations of the lids, etc. It is likewise useful in many cutaneous diseases, and may be advantageously employed as a dressing to wounds and indolent ulcers.

It is somewhat similar to a preparation which has been extensively sold under the name of "*Pettit's Ophthalmic Balsam or Eye Salve,*" and the formula of which is as follows: Take of White Precipitate *three ounces;* Oxide of Zinc *four ounces;* Benzoic Acid *two drachms;* Sulphate of Morphia *forty-eight grains;* Oil of Rosemary *twenty drops.* Rub these thoroughly together, in a mortar, until they are well incorporated, and then add them gradually to a warm compound made by melting together Olive Oil *two pounds;* Spermaceti *twelve ounces;* White Wax *four ounces;* stirring constantly till cold.

A preparation of a similar character, known as *Brown* or *Ophthalmic Ointment,* has enjoyed considerable reputation in the east, in the treatment of ophthalmic diseases; it is composed of Red Precipitate *two and a half drachms;* Oxide of Zinc *one drachm;* Fresh Butter *three ounces;*

White Wax *half an ounce;* Camphor, dissolved in Olive Oil, *one drachm.* Mix. It is a French preparation.

UNGUENTUM ZINCI SULPHATIS. *Ointment of Sulphate of Zinc.*

Preparation.—Take of Sulphate of Zinc *one scruple;* Fresh Butter *two drachms.* Triturate together.

Properties and Uses.—This ointment is very beneficial in eruptions of the skin, fungous growths, gangrenous and indolent ulcers, fistula, hemorrhoids, ulcerations of the cornea, etc. If it acts too severely it may be rendered milder by the addition of butter in necessary quantity.

VERATRIA.

Veratria.

Preparation.—Cevadilla Seeds are freed as much as possible from the hulls, finely powdered, the powder digested in a tin or copper still with three times its weight of Alcohol 70–80 per cent. for one day; when cool, this is to be strained, the residue pressed and treated twice again with the same quantity of alcohol. The tinctures are allowed to subside, the bottoms filtered, one-sixth their weight of water added, the alcohol distilled, a considerable quantity of animal charcoal added to the residue, which is then evaporated with a gentle heat to dryness. The dry mass is finely powdered, treated in a flask with three times its weight of water which contains dilute sulphuric acid, equaling in weight one-hundredth that of the seeds with the hulls,—digested for one day at a gentle heat, allowed to remain in the cold for one day, then strained, twice again digested with acidified water, and, after filtering, the acid liquors are precipitated with excess of carbonate of soda. The precipitate is allowed to subside completely, and after decanting, the supernatant liquor thrown on a filter, and washed with cold water until this runs off colorless. While still moist it is treated with a large amount of water, dilute sulphuric acid added by drops until entirely dissolved, then digested with purified animal charcoal, thrown down with ammonia, the precipitate washed and dried with a very gentle heat. The product from thirteen pounds of seeds from hulls, will be five or six drachms.

History.—Veratria exists in the seeds combined with an acid. Alcohol dissolves it together with resin and extractive matter. After separating the alcohol the residue is evaporated to dryness to render the resin perfectly insoluble; the charcoal facilitates the next digestion. Dilute sulphuric acid dissolves the veratria with some extractive matter and a trace of resin. The alkaloid is thrown down by carbonate of soda, and with it the coloring matter; to remove the latter a second solution in acidified water and digestion with animal charcoal is necessary, and ammonia then precipitates the veratria entirely pure. It must be dried at a gentle heat, otherwise it agglutinates.—*Witt.*

Mr. Jas. Beatson, of the U. S. Naval Laboratory, N. Y., has given the following process for procuring veratria, which he considers superior to any other in use: Seventy-three pounds (avoirdupois) of sabadilla were rubbed upon a coarse wire sieve, which separated the seed from the capsules, and reduced to a coarse powder, in Swift's drug mill. Finding that a portion of the veratria was still retained with the membranous follicle, he also passed the capsules through the mill, which, from their elasticity, were but coarsely comminuted; the finer portions he separated with a coarse sieve, and mixed with the ground seeds, moistened with alcohol, and allowed them to stand for twelve hours. He then introduced them into a displacement apparatus, and exhausted them thoroughly with rectified alcohol, in the following manner: Into the displacement apparatus he introduced thirty gallons of rectified alcohol, and when a quantity had percolated sufficient to fill his still, he commenced distillation,—returning the recovered alcohol into the displacement apparatus and continuing the percolation and distillation, until the seeds were thoroughly exhausted—collected all the alcohol he could from the exhausted seeds, and continued the distillation until the tincture, in the bottom of the still, was of a syrupy consistence; poured this, while hot, into eight times its volume of cold water, threw the whole upon a calico filter, and washed with cold water, until the washings ceased to indicate the presence of veratria; mixed the washings with what passed first through the filter, and added liquor ammoniæ in excess (about four pounds), which precipitated the veratria with a little of the coloring matter. Washed the precipitate with cold water which removed the greater portion of the coloring matter. Dried with a very gentle heat, and when the moisture was completely expelled, eleven and a quarter ounces of pure veratria were obtained, with but a faint shade of coloring matter.—*Am. Jour. Pharm.*, *XXVI.*, 5, 1854.

Pure veratria is a tolerably white, light, amorphous powder, of an excessively sharp, burning taste, inodorous, but its dust causes an intense sneezing and burning sensation in the nose. Commercial veratria is pulverulent, odorless, of a grayish or brownish white, and a bitter, acrid taste. At 240° F., veratria fuses to a yellow liquid, becoming brown at a higher temperature and giving off white vapors, it then ignites and leaves a coal-like residue which must be entirely combustible. It is insoluble in water, sparingly soluble in ether, and soluble in three parts of cold alcohol of 80 per cent., and in two parts, of boiling. One part is scarcely dissolved in fifty parts of ether. It possesses alkaline properties, and forms salts with the acids which are of difficult crystallization. Both the sulphate and hydrochlorate of veratria are soluble in water. Veratria is alkaline in its reaction, combustible, fusible, uncrystallizable, soluble in alcohol, and gives an intense red color with sulphuric acid, and a yellow color with nitric acid. Veratria dissolved in dilute acetic acid, produces a whitish precipitate of tannate of veratria, with tincture of nut-galls or tannic acid; and a white one, *hydrated veratria*, with ammonia.—*P.* Lime and other mineral admixtures are detected by the residue on burning; and organic substances by the large carbonaceous residue. Its formula is $C_{34} H_{22} NO_6$; its equivalent weight 288.

Properties and Uses.—Veratria (or its salts) is a powerful irritant poison, causing, when swallowed, violent vomiting, profuse diarrhea, stupor, and convulsions; taken into the nostrils in minute quantity, it occasions severe coryza and excessive sneezing. In medicinal doses it produces a feeling of warmth in the stomach and bowels, which extends to the chest and extremities. When applied externally, in small proportion mixed with lard, it excites a singular sense of heat and prickling in the part, without redness or vesication; and sometimes it gives rise to headache, nausea, griping, slight diarrhea, and depression of the action of the heart. Its use internally is followed by constipation; occasionally by copious bilious evacuations. It does not act as a narcotic.

Veratria has been recommended internally in nervous palpitation, palsy, epileptic convulsions, pertussis, gouty, rheumatic, and neuralgic affections, dropsy, etc., but its efficacy in these affections is not well established. The dose is from the twelfth to the sixth of a grain three times a day, in pill form. One grain of veratria may be mixed with twelve grains each of liquorice powder and extract of hyoscyamus, and made into twelve pills; one of these may be given every three hours. It is best used in the form of a salt, as the acetate, tartrate, citrate, or sulphate. If the active principle of veratrum viride should prove to be veratria, this alkaloid may become a valuable agent in febrile and inflammatory diseases.—*See Am. Jour. Pharm., XXIX.*, 204.

Veratria is more frequently used as a local application, than as an internal remedy. It is formed into an ointment, liniment, or tincture, in the proportion of from five to forty grains of veratria to the ounce of lard, or oil, etc., a small portion of which is to be rubbed on the affected part for ten or twenty minutes each time, repeating the application twice a day. Not over three or four grains must be used in a day, and in ordinary cases only one or two grains. If the skin is tender or irritated still less must be used; and if there be a cut or abrasion, it must not be used at all. It is applied externally in the above named forms of disease, (See *Mixtures page* 1161, *and Ointments page* 1326).

VINA MEDICATA.

Medicated Wines.

By medicated wines we mean the tinctures of those medicinal agents which are insoluble in water, or which do not require as stimulant a solvent as rectified or proof-spirit, but which are capable of yielding their virtues to wine, either pure or diluted. As a general thing vinous tinctures are much inferior to alcoholic, on account of their tendency to become decomposed, and the uncertainty of their strength, and should, therefore, be made without heat, in limited quantities at a time, and kept cool in well closed bottles. Bitters and cordials have, heretofore, been among the prominent medical agents peculiar to American practice, a few of which are yet retained, and some of which we have placed under the present head in order to avoid the introduction of a new class of pharmaceutical preparations; yet, from the consequences following a course of treatment by bitters, viz.: the cultivation of a taste or appetite for alcoholic stimulus, it is to be hoped, that even these will eventually be dispensed with for means and preparations fully as efficacious, and without the evil results which sometimes occur from their use.

Wines owe their solvent properties to the alcohol which they contain, as well as to the acid which they usually hold in greater or less proportion; and in the selection of them for medical purposes, the purest qualities only should be chosen; those most commonly employed are Sherry, Madeira, and Teneriffe. Sherry wine is preferable to all others in preparing medicated wines, as being less liable to change or decomposition; *Native wine* forms an elegant medicated wine, when the article is to be used immediately; but if the compound be allowed to stand any time, fermentation and decomposition takes place. Medicated wines, like tinctures, may be prepared by Maceration or by Displacement.

1. *By Maceration.*—The powdered article or articles are placed in wine, and are allowed to macerate in a close glass bottle, usually for fourteen days, with occasional agitation; after which the articles are expressed, if necessary, and filtered through paper, or a fine muslin cloth.

2. *By Displacement.*—The powdered article or articles, are first covered with wine, and allowed to stand until they are moistened throughout, and which generally requires from twenty-four to thirty-six hours; the whole is then transferred to a displacement apparatus, and wine gradually poured on, and allowed to percolate or filter until the requisite amount has passed.

VINUM CINCHONÆ AROMATICUM. *Aromatic Wine of Cinchona.*

Preparation.—Take of powdered Red Peruvian Bark *four ounces;* Coriander, bruised, *one drachm;* Cinnamon Bark, in powder, *two drachms;* Diluted Alcohol *a sufficient quantity.* Macerate the articles in Alcohol, (about a pint), then place in a percolator, and exhaust with Diluted Alcohol. Evaporate to expel the Alcohol, and filter to separate the resin, which will give about half a pint of liquid. To this, add Sherry or Madeira Wine *sufficient* to make the whole amount to half a gallon, White Sugar *half a pound*; Tartaric Acid *one drachm.*

Properties and Uses.—This is a pleasant aromatic tonic, and may be used in all cases where a tonic and gentle stimulating action is desired, in doses of from one to four fluidounces, three or four times a day. Catawba wine may be substituted for the Sherry or Madeira, when the compound is to be immediately administered.

VINUM COLCHICI RADICIS. *Wine of Colchicum Root.*

Preparation.—Take of Colchicum Root, coarsely bruised, *ten ounces;* Sherry Wine *one pint.* Form into a medicated wine by Maceration or Displacement, as explained on page 1341, and make one pint of the preparation.

Properties and Uses.—The want of uniformity of strength in the colchicum bulb brought to this country, requires it to be used in large amount, as compared with its menstruum, in order to secure an efficient vinous solution of it. Wine of Colchicum Root has been used in gout, gouty rheumatism and neuralgia. Its effects will be much more decided in many instances, by associating it with a solution of sulphate of morphia, and exhibiting it in conjunction with magnesia or its sulphate. Over-doses may occasion serious results. The dose is from five minims to sixty, every three or four hours, or oftener when the symptoms are urgent, continuing its use until its peculiar effects have manifested themselves.

VINUM COLCHICI SEMINIS. *Wine of Colchicum Seed.*

Preparation.—Take of good Colchicum Seed, bruised, *two ounces;* Sherry Wine *twelve fluidounces.* Form into a medicated wine by Maceration, as explained on page 1341, and make twelve fluidounces of the preparation.

Properties and Uses.—Colchicum seed are not so apt to deteriorate as the bulb, and preserve their activity unchanged for a much longer period; consequently, they do not require to be used so largely in proportion to their menstruum, as the bulb. This medicated wine may be employed for the same purposes as the wine of the bulb, or the tincture of the seed. In over-doses, it is capable of producing death. The dose varies from half a fluidrachm to one or two fluidrachms. The seeds should always be bruised to obtain their full medicinal activity.

VINUM ERGOTÆ. *Wine of Ergot.*

Preparation.—Take of finely powdered Ergot *ten drachms;* Sherry Wine *eight fluidounces.* Form a medicated wine by Maceration or Displacement, as explained on page 1341, and make eight fluidounces of the preparation.

Properties and Uses.—This may be used during labor, as a parturient, in doses of two or three fluidrachms; in other instances it may be given in doses of one or two fluidrachms, three or four times a day, and gradually increased if desirable.

VINUM HELLEBORII COMPOSITUM. *Compound Wine of Hellebore.*

Preparation.—Take of Black Hellebore, in coarse powder, Logwood chips or raspings, Helonias Root, in powder, each, *two ounces;* Sherry Wine *one pint and a half.* Form into a medicated wine by Maceration or Displacement, as explained on page 1341, and make one pint and a half of the preparation.

Properties and Uses.—This preparation is tonic and cathartic, exerting a direct influence on the female reproductive organs. It has proved serviceable in menstrual derangements as amenorrhea, dysmenorrhea, and some painful uterine affections. The dose varies from half a fluidounce to one or two fluidounces, every three or four hours.

VINUM HYDRASTIS COMPOSITUM. *Compound Wine of Golden Seal. Wine Bitters.*

Preparation.—Take of Golden-Seal Root, Tulip-Tree Bark, Bitter-root, each, bruised, *one drachm;* Prickly-Ash Berries, Sassafras Bark, Capsicum, each, *half a drachm;* Sherry Wine *three pints.* Form into a medicated wine by Maceration or Displacement, as explained on page 1341, and make three pints of the preparation.

Properties and Uses.—This is useful in dyspepsia, and in all cases where tonics are required, with gentle stimulation. The dose is from half a fluidounce to one or two fluidounces, every three or four hours.

VINUM IPECACUANHÆ. *Wine of Ipecacuanha.*

Preparation.—Take of the Root of Ipecacuanha, bruised, *two ounces;* Spanish White-Wine (Sherry) *two pints.*—*Ed.*—*Dunc.* Form into a medicated wine by Maceration or Displacement, as explained on page 1341, and make two pints of the preparation.

Properties and Uses.—This wine contains all the medicinal qualities of the drug, and as an emetic is sometimes preferred in infantile cases. An adult may take a fluidounce for a dose, when vomiting is required; a child a year or two old may take a fluidrachm, repeating it every ten or twenty minutes until it vomits. From ten to thirty minims have an expectorant and diaphoretic effect, if repeated at regular intervals of every one or two hours.

VINUM PHYTOLACCÆ COMPOSITUM. *Compound Wine of Poke. Rheumatic Liquid.*

Preparation.—Take of Inspissated Juice of Poke Berries, White Turpentine, each, *four ounces;* Sherry or Native Wine *two gallons.* Macerate for fourteen days, with occasional agitation, and filter.—*Beach's Am. Prac.*

Properties and Uses.—This is an excellent preparation for chronic rheumatism, chronic gonorrhea, syphilitic pains, etc. The dose is from half a fluidounce to a fluidounce, two or three times a day.

VINUM SAMBUCI. *Wine of Elder. Hydragogue Tincture.*

Preparation.—Take of Elder Bark, Parsley root, each, *an ounce;* Sherry Wine *a pint.* Form into a medicated wine by Maceration or Displacement; as explained on page 1341, and make one pint of the preparation.

Properties and Uses.—Wine of Elder is useful in dropsical diseases, especially ascites, and dropsy supervening upon scarlatina or other exanthematous diseases. Dose, two ounces, three or four times a day. This preparation may be made for immediate use by digesting the articles with heat for an hour.

VINUM SYMPHYTI COMPOSITUM. *Compound Wine of Comfrey.*

Preparation.—Take of Comfrey Root, Solomon's-Seal Root, Helonias Root, each, bruised, *one ounce;* Chamomile Flowers, Colombo Root, Gentian

Root, Cardamom Seeds, Sassafras Bark, each, bruised, *half an ounce;* Sherry Wine *four pints;* Boiling Water *a sufficient quantity.* Place the Herbs in a vessel, cover with Boiling Water, and let the compound macerate for twenty-four hours, keeping it closely covered; then add the Sherry Wine. Macerate for fourteen days, express and filter.

Malaga Wine, or Metheglin, which are sometimes used in this preparation, are inferior to Sherry Wine, and more liable to decomposition. The addition of Sugar to this Wine of Comfrey, is very apt to disagree with many persons, and thus destroy its efficacy. This preparation is sometimes called *Restorative Wine Bitters,* but is much superior to the article formerly known by this name.

Properties and Uses.—This is a most valuable tonic in all diseases peculiar to females, especially leucorrhea, amenorrhea, weakness of the back, etc. The dose is from half a fluidounce to two fluidounces, three or four times a day.

PART III.

APPENDIX.

OBSOLESCENT AND OBJECTIONABLE MEDICINES.

UNDER this head will be included those minerals which have for many years past been the principal remedial agents used by medical men, but which, in consequence of the great uncertainty of their action, and the permanently deleterious effects they produce in the system, are going rapidly out of use, being at the present day employed by very few of the liberal and investigating members of the profession. A brief reference to these agents is all that is considered necessary in the present work. It may be proper to state, however, that among the agents which have been referred to under this head, several have been recently introduced into the practice of medicine, some of which are equally as objectionable as those of older date, and which may be known by the asterisk (*) prefixed to their Latin names.

ANTIMONIUM. *Antimony.*—This metal when pure is of a lustrous silvery white appearance, with a fibrous texture, melting at 810°, and having the specific gravity 6.43, the equivalent weight 129, and symbol Sb.—from its ancient name *Stibium.* This metal is not employed in medicine, though it forms the basis of several remedial agents, as follows:

*ANTIMONII OXYDUM. *Oxide or Teroxide of Antimony.*—Formed by dissolving the Sulphuret of Antimony *one ounce* in Hydrochloric Acid *four fluidounces*, by means of heat; boiling the solution for half an hour, then pouring it into *a pint and a half* of Water; washing the precipitate first with cold water, and then with a weak solution of carbonate of soda to free it from acid, and then drying it over a vapor-bath. It forms a white powder which is permanent in the air, becomes yellow by heat, but if heated in the open air, it absorbs oxygen and becomes converted into antimonious acid ($Sb\,O_4$); the yellow fluid which it forms when fused, concretes by cooling into a crystalline mass. When pure it is wholly soluble in hydrochloric acid. Its formula is $Sb\,O_3$, and its equivalent weight 153. This article is generally employed in the preparation of the various medicinal salts of antimony. It has been occasionally used as a sedative in doses of from one to ten grains, though its action is uncertain, being sometimes inert, and again causing violent emesis.

ANTIMONII OXYDUM NITROMURIATICUM. *Nitromuriatic Oxide of Antimony. Algarothi's Powder.*—This is a white powder, and was once employed as an emetic; but is now used only for preparing tartar-emetic.

ANTIMONII ET POTASSÆ TARTRAS. *Tartrate of Antimony and Potassa. Tartar Emetic.*—This preparation is made in various ways, the readiest one of which is to boil together *four parts* of the Nitromuriatic Oxide of Antimony, and *five parts* of Bitartrate of Potassa, in *thirty-four parts* of Distilled Water; filter the liquor, concentrate, and crystallize by slow cooling. Tartar-emetic crystallizes in colorless, transparent, right-rhombic octohedra, which are odorless, of a feebly sweetish taste becoming afterward styptic and nauseously metallic, and slightly efflorescent. They dissolve in fourteen parts of cold and two of boiling water, the solution giving an acid reaction; alcohol does not dissolve them. When heated they become black, are decomposed, and are converted into metallic antimony. They contain one equivalent, each, of teroxide of antimony, potassa, and tartaric acid, and three equivalents of water; their formula is $KO\,Sb\,O_3\,\bar{T}\,2\,HO$, and equivalent weight 359. Tartar-emetic is *incompatible* with the concentrated acids, the metallic oxides of the second class and their carbonates, the hydrosulphates, soaps, gallic acid, and most of the bitter and astringent vegetable substances, as Peruvian-bark, rhubarb, etc. If oxalate of ammonia be added to an aqueous solution it causes a white precipitate if *lime* be present; ferrocyanuret of potassium causes a brown precipitate if *copper* be present,—a blue one if *iron;* and the presence of copper may be rendered certain if, on treating the solution with liquor ammonia, a permanent blue solution is formed,—and of iron when sulphocyanuret of potassium causes a red color. If *sulphates* or *sulphuric acid* be present, chloride of barium will give a white precipitate; and nitrate of silver when *hydrochloric acid* or *hydrochlorates* are the impurities. *Arsenic* may be detected by the usual tests; it is, however, rarely present.

Tartar-emetic has been much used as an emetic in doses of from one to four grains dissolved in a tumblerful of warm water, of which one or two tablespoonfuls are to be given every five or ten minutes, until vomiting is produced, aiding its operation by frequent draughts of warm water. It has likewise been employed as a nauseant and diaphoretic in febrile and inflammatory diseases, especially of the thoracic organs; the dose varying from one-fourth of a grain to a grain, every one, two or four hours. One or two grains in a pint or two of water will generally act as a purgative. In doses of four grains gradually increased to one or even two scruples during the twenty-four hours, Rasori, Laennec, Balfour and others have considered it very useful in acute inflammations, as, peripneumonia, hepatitis, jaundice, etc. It is thus said to exert a sedative or contra-stimulant effect, and can only be advantageously administered in this way, provided the first doses do not produce vomiting nor superpurgation, and the stomach be in that state termed *tolerance.* Some practitioners pretend to have cured many chronic diseases by the administration of minute doses of tartar-emetic, repeated three or four times daily.

Applied to the skin, tartar-emetic produces a pustulous eruption of a peculiar character, accompanied with a more or less intense inflammation. It is often used in the form of liniment, ointment or plaster, in this way, as a counter-irritant in many painful, deep-seated, and chronic maladies. A drachm of tartar-emetic to four drachms of lard for an ointment, or, dissolved in a fluidounce and a half of water as a wash. Not unfrequently the external application of tartar-emetic gives rise to obstinate ulcers, sometimes of a gangrenous character, and in some cases severe and fatal constitutional disorder has resulted.

Taken internally, in large quantities, tartar-emetic acts as a violent poison, and may produce a very lively inflammation of the intestinal canal, as manifested by excessive vomiting, hypercatharsis, tenesmus, great heat and pain in the gastric region, colicky symptoms, oppressed breathing, cold surface, and gradual loss of the senses and vital powers. The antidotes are infusions of geranium maculatum and convallaria multiflora, solution of tannic acid, or other vegetable astringent and mucilaginous infusions, aided by preparations of opium to check the excessive evacuations; together with the usual means for combating inflammatory symptoms.

VINUM ANTIMONII. *Antimonial Wine.*—This preparation is made by dissolving *thiry-two grains* of Tartar-emetic in *one pint* of Sherry Wine. One fluidounce contains two grains of tartar-emetic. This preparation is used among children as a substitute for the aqueous solutions of the tartrate of antimony and potassa. Ten to thirty drops, repeated as often as required, act as a diaphoretic or expectorant; when it is desired to produce vomiting in children, the dose is from twenty to sixty minims, repeated every ten or fifteen minutes, until the desired effect is produced.

ANTIMONII TERSULPHURETUM. *Tersulphuret, or Sesquisulphuret of Antimovy*, $Sb S_3=177$.—This is known in commerce by the name of *crude antimony*, and is in masses formed of shining crystalline needles, of a bluish-gray color, staining paper black, tasteless, and of the specific gravity 4.5. It is insoluble in water, soluble in hydrochloric acid with evolution of sulphurous acid, fuses readily, and when reduced to a very fine powder by levigation and elutriation forms the prepared sulphuret of antimony of the Dublin Pharmacopœia. It is composed of one equivalent of antimony, and three equivalents of sulphur, and is called by some the *crystallized tersulphuret of antimony.* It was formerly used as an emetic; but is now out of use, though occasionally used in the *prepared* form, as an alterative and diaphoretic in gout, rheumatism, cutaneous diseases, scrofulous engorgements, and old venereal affections. Its dose is from half a scruple to a drachm, in pill-form or mucilage.

ANTIMONII TERSULPHURETUM AMORPHUM. *Amorphous Tersulphuret of Antimony.* There are two varieties of this substance, one known as *a mineral kermes*, the other as *b* the *precipitated sulphuret of antimouy.*

a. Kermes mineral is prepared by the *dry process*, heating in a crucible *two parts* of the Tersulphuret of Antimony, and *one part* of common Potassa; pulverize the mass thus obtained, and boil it with ten or twelve parts of water—filter the liquor, while boiling, and the kermes precipitates on cooling. In the *humid way* it is prepared by boiling for half an hour *one part* of finely powdered Sulphuret of Antimony, 22.5 parts of Crystallized Carbonate of Soda, and 250 of water; kermes precipitates likewise on cooling. The last mode gives a finer article, preferred to that by the former process. It is a reddish-brown powder with a tinge of purple, of a velvety appearance, light, inodorous, of a slowly developed metallic taste, and insoluble in water or alcohol. Exposed to air or light, it loses its red color and velvety aspect. It is completely soluble in hydrosulphuret of ammonia. Heated to a red heat with charcoal, it is converted into metallic antimony. In doses of from six to ten grains, kermes mineral is an emetic, but its action is uncertain. In smaller doses, say from one-fourth of a grain to a grain or two, in mucilage, it is a stimulant expectorant, nauseant, and diaphoretic, and is occasionally employed in the last stage of peripneumonia, in chronic catarrhs, humid asthma, cutaneous diseases, gout, rheumatism, etc. It is seldom used in this country.

b. Precipitated Sulphuret of Antimony (Antimonii Sulphuretum Præcipitatum), called also "oxysulphuret of antimony." This salt is prepared by boiling *one part* of Sulphuret of Antimony with *eighteen parts* of Water of Caustic Potassa, for an hour; straining the hot liquid through a double linen cloth, and dropping into it Diluted Sulphuric Acid, *eleven parts.* Wash away the sulphate of potassa with warm water; dry the brown antimoniated sulphur, and rub it into fine powder. It is a golden red, odorless, tasteless substance, permanent in the air, but decomposed by the action of both light and air, insoluble in water, soluble in boiling liquor potassa, and slightly so in liquor ammonia, and is dissolved almost wholly in hot concentrated hydrochloric acid, and the solution becomes milky with water. It is composed of one equivalent of teroxide of antimony, five of tersulphuret of antimony, and sixteen of water. It has been used as an alterative in chronic affections of the skin, rheumatism, secondary venereal, and chronic hepatitis; it is one of the constituents of Plummer's alterative pill. The dose is from one to three grains every six hours; when over five grains, the dose will be apt to occasion emesis.

There is also another preparation which has been much used by the German physicians, and which possesses the same medicinal virtues as the kermes mineral. This is the "Antimonii Pentasulphuretum," or *Pentasulphuret of Antimony*, $Sb\ S_5=209$. It is more commonly known as the *Golden Sulphuret of Antimony*, and is prepared by pouring a few drops of nitric, sulphuric, or acetic acid into the mother-waters from which the kermes has been procured, washing the precipitate, and drying it where light can not have any access. It forms an orange-yellow colored powder, odorless, tasteless, insoluble in water, and, in its reactions and medicinal properties, resembling the kermes mineral. Its dose is from half a grain to two or three grains.

PULVIS ANTIMONII COMPOSITUS. *Compound Powder of Antimony. James' Powder.*—This nostrum was first prepared by Dr. James, who died in 1776. It is prepared by calcining, in an iron crucible, *one part* of Tersulphuret of Antimony, and *two parts* of Horn Shavings, stirring constantly until vapors cease to rise. Then rub the residue to powder, put it in a crucible with a perforated cover, and raise it gradually to red heat, which must be maintained for two hours. Reduce the product, when cold, to fine powder. It forms a white, gritty, odorless, tasteless powder, partially soluble in boiling water, and which solution gives an orange-yellow precipitate with sulphureted hydrogen. It possesses the general properties of the antimonials according to the doses in which it is administered, and like them is very uncertain in its operation. It is principally used as a sedative and diaphoretic in febrile diseases, in doses of from one to four grains, in powder or bolus, repeating them every three or four hours, as may be required.

ANTIMONII TERCHLORIDUM. *Terchloride of Antimony*, $Sb\ Cl_3=235.5$. This preparation has also been known by the names, *muriate of antimony*, *sesquichloride of antimony*, *oil* or *butter of antimony*, etc. The pure article is not used in medicine; it may be procured by placing in a glass retort *three parts* of pure metallic antimony, and *eight parts* of perchloride of mercury, and gradually heating it; the butter of antimony sublimes and condenses in the neck of the retort. It is white, thick, unctuous, semi-transparent, inodorous, and of a very caustic taste. It is decomposed by water and blood; attracts moisture from the air and becomes yellow; melts below 212° F., volatilizes a little above this temperature, forming on cooling tetrahedral prisms. According to Souberain, it may be made by dissolving with the aid of gentle heat, *one part* of Sulphuret of Antimony in *five parts* of Muriatic Acid; let it stand, decant off the clear liquid, evaporate, and then distill almost to dryness. Preserve it in bottles having well-ground glass stoppers. This article is used only as a caustic to fungous growths, poisonous bites of reptiles or animals, etc. Having first carefully removed the blood, which decomposes it, apply the caustic liquid to the wound or tumor by means of a camel's-hair pencil, or on a dossil of lint.

* ARGENTI CHLORIDUM. *Chloride of Silver*, $Ag\ Cl=143.5$. This salt may be prepared by adding to a solution of nitrate of silver, an excess either of hydrochloric acid, or of a solution of common salt. Wash the white precipitate, collect it on a filter, and dry it in the dark, at a gentle heat. When found native this salt has been called *horn silver*. It is soluble in 3072 parts of water, soluble in ammonia, and gradually acquires a purple color on exposure to the air. At 500° F. it fuses, and on cooling forms a gray semitransparent mass, called *luna cornea*, from its resemblance to horn. It is not decomposed by the acids or pure alkalis, but is by the alkaline carbonates. Its specific gravity is 5.129; that of the native chloride is 5.552. This salt has been recently recommended by Dr. Perry in epileptic disease, chronic affections of the bowels, and as a substitute in many diseases for the nitrate of silver, in doses of two or three grains every three or four hours.

ARGENTI CYANURETUM. *Cyanuret or Cyanide of Silver.*—This is prepared by adding an excess either of cyanuret of potassium, or of hydrocyanic acid to a solution of nitrate of silver. Collect the precipitate on a filter, wash it well, and dry it. It is a white powder, devoid of taste, is not dissolved by water, soda or potassa, but is by ammonia, and is used for the preparation of hydrocyanic acid.

*ARGENTI IODIDUM. *Iodide of Silver.*—This is prepared by adding a solution of iodide of potassium to a solution of nitrate of silver; wash the precipitated iodide of silver, and dry it by a gentle heat. The powder is of a greenish-yellow color, insoluble in water, very slightly soluble in ammonia, and easily decomposed when heated with potassa. It fuses at a low red heat, and assumes a reddish color. Dr. Chas. Patterson, of Dublin, has found it to act in various diseases as a substitute for nitrate of silver, producing its therapeutical influences without discoloring the skin. The dose for an adult is a grain or two, in pill, every three or four hours.

* ARGENTI OXYDUM. *Oxide of Silver.* $Ag\ O=116$.—To a solution of nitrate of silver add a solution of caustic potassa, as long as any precipitate falls; collect the brown precipitate on a filter, wash it well, and dry it at a heat of about 180° F. Oxide of silver has a grayish-brown color, becoming darker when dried; it is almost tasteless, and has the specific gravity 7.143. When exposed to the direct rays of the sun it gives out oxygen gas, and is converted into a black powder. It is insoluble in the fixed alkalies, readily soluble in caustic ammonia, and very slightly soluble in water. With caustic ammonia it forms a black fulminating powder, on which account the experimenter should be careful about using ammonia with it, or for preparing it, as it is always attended with danger. This salt has been employed in neuralgic and irritable conditions of the stomach and bowels, in dyspepsia, water-brash, chronic

diarrhea and dysentery, epilepsy, etc. In uterine diseases attended with great irritability and augmented discharges, it has been found especially beneficial, as in hysteralgia, menorrhagia, dysmenorrhea, and leucorrhea. Its use has occasioned salivation. The dose is from half a grain to two grains, two or three times a day, in the form of pill or powder. Pereira states that its long continued use will occasion a permanent discoloration of the skin. A drachm of the oxide to an ounce of lard forms an ointment which has been used in irritable ulcers, both syphilitic and non-syphilitic, in sore nipples, and in gonorrhea applied to the urethra by means of a bougie.

ARSENICUM. *Arsenic.*—This is a metal of bluish white color, not unlike that of steel, with a great deal of brilliancy. It is odorless, but when heated emits a strong odor of garlic. It is the softest of all the metallic bodies, and is very brittle and easily reduced to powder. Its specific gravity is 5.9, its symbol As, and its equivalent weight 75. At 365° F. it sublimes without melting. It may be kept under water without alteration; but when exposed to the open air, it soon loses its luster, and often becomes black and falls into powder. It combines with two proportions of oxygen, forming compounds which possess acid properties; namely *arsenious acid* and *arsenic acid*, the latter being found in combination with bases, forming *arseniates.* Its several medicinal preparations are the following:

ACIDUM ARSENIOSUM. *Arsenious Acid.* $As\,O_3{=}99$.—This is generally known by the names, *arsenic*, *white arsenic*, and *white oxide of arsenic.* It is prepared by roasting the ore of arsenical cobalt, or of arsenical iron, coarsely pulverized, this acid volatilizes and condenses on the inside of the tube or chimney. A second sublimation purifies it. It is a white, brittle, compact, transparent substance, of a glassy appearance, inodorous, nearly tasteless, and soluble in thirteen parts of boiling and eighty of cold water, the solutions being acid in their reactions; alcohol and oils, dissolve a small quantity of it; thrown upon burning coals, it volatilizes with a thick white smoke of a garlicky odor; and heated with charcoal and a little fixed alkali, it is decomposed, and the metallic arsenic is sublimed. By age, arsenious acid slowly becomes opaque. The specific gravity of the transparent acid is 3.73; of the opaque 3.69. It is *incompatible* with lime-water, hydrosulphate of potassa, and decoction of barks generally.

Taken internally, arsenious acid is a most violent poison, producing in over-doses, nausea, vomiting, burning pain of the throat and stomach, soon extending over the whole abdomen. Although, under certain circumstances, a large amount of arsenious acid has been swallowed without any very serious effects, yet, as a general rule, it is considered that death may be produced by one or two grains of it taken at a dose. A larger quantity may cause vomiting so quickly as to expel it from the stomach before its deleterious action fairly commences; and a distension of the stomach with food has prevented it from proving fatal. Yet there is much uncertainty in these matters, as experience has demonstrated. When emesis is caused by its poisonous action, the matters vomited may be bilious or tinged with blood, occasionally there will be no pain or vomiting. There is very apt to be a sense of heat, dryness, and constriction of the throat, with incessant thirst and great difficulty of swallowing. When the bowels are inflamed the abdomen is tense and hard, with loose, bloody stools, tenesmus, heat and excoriation of the anus. The urine may be diminished or suppressed; pulse quick, small, feeble, and irregular; heart beating irregularly with palpitation; breathing laborious and often painful; tongue dry and furred; with frequently tremblings, cramps, and delirium previous to death; occasionally dark spots or an eruption on the surface will be present. The symptoms are by no means uniform, and will vary with different individuals; there may be faintness, or actual syncope, convulsions, paralysis, great prostration, coma, etc. In some cases death may ensue, without any severe or well-marked symptoms. When arsenic is taken in small doses, continued for a long period, but acting as a slow poison, there will be "a gradual sinking of the powers of life, without any violent symptom; a nameless feeling of illness, failure of the strength, an aversion to food and drink, and all the other enjoyments of life." Among the many symptoms which have been observed in such cases, the following are the principal: flatulence, heat or pain in the stomach and bowels, loss of appetite, thirst, nausea, vomiting, purging, or a loose condition of the bowels, with griping; the tongue furred, mouth and throat dry and constricted, and sometimes salivation. The pulse will be quick, small, and often irregular; a dry cough, with oppressed respiration; wasting of the body; very irritable stomach, immediately rejecting any thing thrown into it. Headache, giddiness, wakefulness; irritation of the conjunctiva, the patient frequently complaining of a feeling like a hair or cobweb in the eye, with redness, swelling or pricking of this organ; the limbs painful, feeble, trembling, subject to numb sensations, cramps or convulsions. An eruption on the surface, falling off of the hair and nails; swelling of the face and feet, and gradual sinking of the patient, with consciousness perfect to the last, or perhaps coma, or delirium. Arsenic, whether taken internally or absorbed from its external application to a wound, almost always occasions gastritis or gastro-enteritis. Beside the stomach and bowels, it also appears to exert a specific influence over other parts of the system, as the heart, nerves, lungs, skin, etc., causing irritation, inflammation, and gangrene, as may be observed by an inspection of these organs after death.

In the treatment of cases of poisoning by arsenic, the first thing to be done is to remove as much of the poison from the stomach as possible, either by employing the stomach-pump, or producing vomiting by tickling the throat and fauces with a feather or the finger, and emetic doses of sulphate of zinc, or sulphate of copper. None of the nauseating emetics must be used, as lobelia, ipecacuanha, etc., as they do not act with sufficient promptness, and favor absorption of the poison by their prolonged nausea previous to vomiting. To sheathe the stomach, and at the same time diminish the solubility of the arsenious acid, demulcents (as milk, white of egg, mucilage, sweet oil, syrup, etc.), and lime-water may be used freely: these likewise promote vomiting. If it is supposed that any of the poison has entered the intestines, the best purgative for its expulsion is castor-oil.

Antidotes should be administered as soon as they can be had; several have been named, as charcoal, and light calcined magnesia, swallowed in large quantities. But the best antidote is, the recently made, pulpy, hydrated sesquioxide of iron, prepared by precipitation with ammonia. It should be given to an adult in tablespoonful doses every three or four minutes, until the severe symptoms have ceased. Dr. Maclagan observes that "as far as chemical evidence goes, at least twelve parts of oxide, prepared by ammonia, *and moist*, are required for each part of arsenic." The oxide of iron may, however, be given in much larger amount, as it is completely free from any deleterious action; and the sooner it is given after the poison has been swallowed, the more prompt and certain will be its effects. It forms with the poison an innocuous salt, the subarseniate of protoxide of iron.

Any inflammatory symptoms which may be present; excessive pain, or great prostration must be treated on general principles; and great care should be observed during convalescence, which is apt to be very tedious, to keep the patient upon fluids only, of a nutritious character, permitting no solids, until all danger of gastro-enteritis has passed.

As a medicine, arsenious acid has been administered internally as a febrifuge in intermittent fevers and other periodical diseases; in lepra, psoriasis, pityriasis, eczema, impetigo, ichthyosis, elephantiasis, and other chronic cutaneous diseases; in chorea, neuralgia, cancer, epilepsy, and tetanus; in chronic rheumatism, especially of a syphilitic character, venereal nodes, syphilis, and secondary syphilis. But its use is attended with great danger; and its administration must be at once stopped when it produces swelling of the face and eyelids, with irritation of the conjunctiva, and disorder of the digestive organs. The dose of arsenious acid is 1-8th, 1-16th, or 1-20th of a grain, two or three times a day, made into pills with crumb of bread. *Fowler's Solution*, which is a solution of Arsenite of Potassa, is made by placing in a glass vessel pure Arsenious Acid, broken in pieces, Carbonate of Potassa, each, *eighty grains*, with Distilled Water *half a pint*; boil until they are dissolved; when cool, add Compound Spirit of Lavender *five fluidrachms*, and sufficient Distilled Water to make the whole measure a pint: the fluid measures being Imperial. The dose is three drops, three times a day, gradually increased to five or even ten drops. *Pearson's Arsenical Solution* is made by dissolving one grain of the arsenite of soda in a fluidounce of distilled water; the dose is from ten to twenty drops, three times a day. All these preparations are employed for similar purposes. Recently, a new solution of arsenic has been used—" Liquor Arsenici Chloridi," *Solution of Chloride of Arsenic*, or *De Valangin's Solutio Solventis Mineralis;* to Distilled Water *one fluidounce*, add Hydrochloric Acid *one fluidrachm and a half*, and Arsenious Acid, in small pieces, *half a drachm*. Boil until the Arsenic is dissolved, then add Distilled Water a sufficient quantity to make the whole measure a pint. The dose is from three to ten drops, three times a day, beginning with the smallest dose, and gradually increasing. *Asiatic Pills* are composed, each, of 1-16th grain of arsenious acid, half a grain of powdered black pepper, and sufficient mucilage of gum Arabic to form a pill.

Applied externally, arsenious acid is a powerful caustic, used in the treatment of cancerous ulcers, lupus or noli me tangere, epithelial cancer, onychia maligna and chancres; but its application requires the greatest caution, on account of the fatal accidents which might occur from its absorption, as well as from the erysipelatous inflammation it is apt to occasion. It has been applied in various forms, thus :—1. Arsenious acid, sublimed sulphur, of each, one drachm, spermaceti cerate one ounce; to be applied on lint, for twenty-four hours, and then to be removed,—when the slough comes away, dress the ulcer with simple ointment. 2. Arsenious acid two grains, spermaceti ointment one ounce. 3. *Arsenical Paste. Rousselot's.* Arsenious acid one part; red sulphuret of mercury sixteen parts; powdered dragon's blood eight parts; applied over the ulcer. The French Codex prescribes eight parts instead of one of arsenic. Various other forms both for the internal and external use of arsenious acid have been recommended by members of the profession.

There are various *tests* for the detection of arsenic, which will now be briefly explained. First, when in a *solid form* or *powder*. 1. Heat a small portion of the article on the point of a penknife in the flame of a spirit-lamp—if it be arsenious acid a white smoke is produced, and the powder disappears. As corrosive sublimate, oxalic acid, hydrochlorate of ammonia, etc., volatilize with a white smoke when heated, the better plan will be to place the suspected powder in a test tube of narrow bore, with a little boracic acid (to counteract the influence of earthy or alkaline bases which prevent a portion of the arsenious acid from rising in vapor.) Heat the tube, and examine the sublimate obtained, by a magnifying glass, if arsenious acid be present sparkling crystals of regular octohedron form will be seen.

2. Arsenious acid or an arsenite evolves a garlicky odor when heated on a piece of red hot charcoal, with scarcely any visible vapor for an inch or two from the coal, when a dense, white, odorless smoke is observed. Other agents, as phosphorus, etc., evolve a similar odor, and therefore taken alone, this is not a reliable test.

3. Mix the suspected article with recently ignited but cold charcoal, or still better with a mixture of charcoal and carbonate of soda, place it in a reduction tube (a common cylindrical glass tube will answer), and apply the heat of a spirit-lamp, the arsenious acid if present, is deoxidized, and metallic arsenic sublimes and condenses into a cooler portion of the tube, where it forms a metallic crust, which is very smooth and brilliant on its outer surface, and crystalline and grayish-white on its inner surface. In this experiment the heat should be applied gradually at first, and care be taken not to get any of the powder on the sides of the tube while introducing it within. To still further determine the character of the crust, it may be converted, by sublimation up and down the tube, into octohedral crystals of arsenious acid, which are soluble in distilled water, and give the reactions hereafter named. If the tube be filed and separated, at the portion where the crust is situated, it may be determined from any other crust by its crystalline texture, iron-gray color, and shiny appearance under examination with a magnifying lens; also by its solution in distilled water and behavior with the tests now about to be named.

Second, *when in solution with distilled water.* 1. An aqueous solution of arsenious acid has a feeble taste; a faintly acid reaction on litmus; and yields shining, octohedral crystals by evaporation on a glass plate, which, when heated, as before stated, sublimes into metallic arsenic.

2. A weak solution of ammonio-sulphate of copper when added to a solution of arsenious acid, produces a pale-green precipitate of arsenite of copper, which is soluble in nitric acid and ammonia. (This test may be made by cautiously adding to a solution of sulphate of copper just enough ammonia to redissolve the oxide of copper which its addition first throws down.) The presence of astringents will prevent the green precipitate from being formed. Some yellow colored or other organic fluids will also give a green color, when thus treated, even though no arsenious acid be present.

3. If a solution of ammonio-nitrate of silver be added to a solution of arsenious acid, a yellow precipitate of arsenite of silver occurs, which is soluble in nitric acid, in solution of ammonia, and in solution of nitrate of ammonia. (This test may be made by gradually adding a few drops of aquæ ammonia to a solution of nitrate of silver, so that the oxide of silver which the alkali at first throws down may be nearly, but not entirely

dissolved.) The presence of much organic matter, or of free acids impedes the action of this test, the latter may be obviated by neutralization with an alkali. If common salt be present in the suspected solution this test will cause a white precipitate, which, should the liquid itself be yellow, may through this medium be mistaken for a yellow precipitate.

4. If a current of hydrosulphuric acid gas (sulphureted hydrogen) be passed through a solution of arsenious acid, a yellow precipitate of tersulphuret of arsenic is produced. The zinc and acid used in preparing the gas should be pure and not contaminated with arsenic, as otherwise the experiment will fail. The yellow precipitate is insoluble in hydrochloric acid, readily soluble in aqua ammonia forming a colorless, very limpid fluid, and, when dried and heated with soda or potassa flux it yields metallic arsenic.

5. If arsenious acid be dissolved in nitric or nitro-hydrochloric acid, it forms arsenic acid, which may be obtained by careful evaporation to dryness. Nitrate of silver produces a red color (arseniate of silver) with arsenic acid. In cases where it is a matter of life or death, all the foregoing tests should be applied for the detection of arsenic, as no one or two of them are considered sufficiently reliable. There are certain other tests, however, which should not be omitted when they are applicable, as they are of importance, as—

1. *Marsh's Test.*—Mix a small portion of the suspected liquid with a mixture of one part of *pure* sulphuric acid and seven or eight parts of distilled water, and pour the mixture over some pieces of *pure* zinc previously introduced into a two-ounce wide-mouthed vial, and immediately close the vial with a cork perforated by a glass tube or pipe-stem. Bubbles of air at once appear. If no arsenious acid be present, hydrogen gas is evolved; but if the liquor holds arsenious acid in solution, the gas evolved will be arseniureted hydrogen, and may be known by its garlicky odor; by burning with a bluish-white flame and the evolution of a white smoke; by its flame depositing on a cold plate of glass or porcelain held over its upper part, a black spot or ring surrounded by a larger white ring of arsenious acid; by metallic arsenic being deposited within a glass tube heated to dull redness, through which the gas is passed; and by metallic silver being precipitated when the arseniureted hydrogen is passed through a solution of nitrate of silver, free nitric and arsenious acids remaining in the solution. Hydrochloric acid may be cautiously added to the solution to convert the excess of nitrate of silver, into the insoluble white chloride of silver. Then filter and test the liquid for arsenious acid; or evaporate to dryness, which gives arsenic acid, with which a solution of nitrate of silver yields a brick-red color or precipitate.

N. B. Care must be taken not to apply a lighted taper to the jet of gas before the air is expelled from the vial, or an explosion may be the result.

The difficulty of detecting arsenic in organic liquids by Marsh's test arises from the great frothing which chokes up the jet. According to Danger and Flandin this may be obviated by placing the organic matter containing the arsenic in a porcelain capsule, adding one-sixth its weight of sulphuric acid, and heat until vapors of sulphuric acid appear. The matter is first dissolved, but during the concentration it is charred. The liquor is to be constantly stirred with a glass rod. The carbonization is effected without any swelling or frothing, and is to be continued until the charcoal is friable and almost dry. A small quantity of concentrated nitric acid, or nitromuriatic acid is to be added, by means of a pipette, when the capsule is cold. This converts the arsenious acid into the more soluble arsenic acid. The mixture is then to be evaporated to dryness, treated with boiling water, and the limpid liquor introduced into Marsh's apparatus, or the vial above referred to, in which it never froths.

According to Blondlot, when poisoned organic substances have been left to putrefy, some sulphuret of arsenic is formed at the expense of the sulphureted hydrogen, and this escapes detection by Marsh's apparatus. Sulphuret of arsenic also forms when the suspected matters are carbonized by the action of sulphuric acid after the process of Danger and Flandin. The arsenic may be extracted by washing the carbonized mass with ammonia, which dissolves the sulphuret. Then the sulphuret may be converted into arsenic acid by the action of nitric acid, and the solution thus obtained be dried by evaporation, dissolved in boiling water, and tested by Marsh's process.

2. *Reinsch's Test.*—If an aqueous solution of arsenious acid be boiled for ten or twenty minutes with pure hydrochloric acid (one-tenth the volume of the arsenical solution, *Christison;* one-sixth, *Taylor*), and fine copper gauze, or thin copper wire, the latter acquires an iron-gray metallic coating of arsenic. If now, the coated copper be washed, dried, cut into small pieces, and then heated in a glass tube or reduction tube by the flame of a spirit-lamp, the metallic arsenic is volatilized, and sometimes yields a metallic ring; but in general it becomes oxidized, and yields a sublimate of minute octohedral crystals. If the coating on the copper be sufficiently thick, it may be scraped in the copper, and heated alone in the tube. The arsenious acid thus obtained in the tube should be dissolved in water and tested with sulphureted hydrogen, ammonio-nitrate of silver, etc., as heretofore explained, or it may be tried by Marsh's process.

When the arsenious acid is contained in organic substances, as stomach, liver, etc., these must be cut into small pieces, and boiled in water acidulated with hydrochloric acid, until all the tissues are dissolved, or broken down into fine flakes or grains. Filter through calico, heat again to the boiling point, and proceed by Reinsch's process, as previously described.

N. B. In Marsh's process, it must be remembered that antimony will produce a crust somewhat resembling the arsenical; and in Reinsch's process, antimony, bismuth, etc., will stain or coat copper so as to deceive the experimenter; hence the necessity for carefully testing the crusts obtained, by the preceding tests for arsenious acid. The apparatus in all these experiments must be perfectly clean, and the chemicals used pure and free, especially, from arsenic. *See Taylor on Poisons*, *Christison on Poisons*, and *Taylor's Medical Jurisprudence.*

* LIQUOR ARSENICI ET HYDRARGYRI IODIDI. *Solution of Iodide of Arsenic and Mercury. Donovan's Solution.*—Triturate eighteen grains of sesquiodide of arsenic, and seventeen grains of biniodide of mercury with two fluidrachms of distilled water, until they combine and dissolve; then add distilled water, enough to make the whole measure half a pint, and filter. Or, it may be made by taking of levigated metallic arsenic $6\frac{8}{100}$ grains, mercury $14\frac{82}{100}$ grains, iodine 49 grains, and alcohol one fluidrachm, and rubbing them together until dry, and a pale-red color has been produced. Then add eight fluidounces of distilled water, triturate for a few minutes, pour into a glass flask, and add hydriodic acid half a drachm, made with iodine two grains, and boil for a few minutes. Upon becoming cold, add distilled water enough to make the whole measure half a pint, and filter. This is said to be useful in lupus, lepra, diseases of the scalp, psoriasis, impetigo, venereal eruptions, and other obstinate cutaneous affections, in doses of from ten to thirty drops two or three times a day.

*ARSENICI IODIDUM. *Iodide of Arsenic.*—Gently heat in a tubulated retort placed in a sand-bath, a mixture of one part finely pulverized metallic arsenic and five parts of iodine; the iodide is afterward to be resublimed to separate the excess of arsenic. This forms an orange-red volatile solid, which is dissolved by water, and is a powerful preparation, combining the effects of arsenious acid and iodine, and requiring great caution in its use. Said to be useful in secondary syphilis, lupus, lepra, and other obstinate affections of the skin. Internally, its dose is one-tenth of a grain, three times a day, in form of pill, gradually increasing to one-third of a grain. Biett's ointment for cutaneous diseases is made of one part of the iodide to one hundred and ninety-two parts of lard, of which one drachm may be used at a time. The solution may be made extemporaneously by mixing together one part of compound solution of iodine and four parts of Fowler's solution, of which the dose is from three to six drops.

*AMMONIÆ ARSENIAS. *Arseniate of Ammonia.*—This salt may be prepared by adding ammonia to a concentrated solution of arsenic till a precipitate appears. This precipitate is dissolved by heat, and the liquid being set aside, deposits large crystals of arseniate of ammonia.—*T.* Biett has recommended it in obstinate cutaneous affections, in doses of from fifteen to twenty drops, in the course of every twenty-four hours, of a solution made by dissolving one grain of the arseniate in distilled water one fluidounce.

*QUINIÆ ARSENIAS. *Arseniate of Quinia.*—In a glass vessel place arsenic acid one drachm and a half, quinia five drachms, distilled water six fluidounces; boil till all is dissolved, filter, and allow to crystallize spontaneously. To purify, redissolve and again crystallize. This is recommended by Bourieres in fever and ague, and other periodical diseases; also used in obstinate cutaneous affections. Its dose is one-fifth of a grain, two, three, or four times a day. Dr. Ringdon prepares an *arsenite of quinia* for similar purposes, thus: Place sixteen grains of arsenious acid, eight grains of carbonate of potassa, and one fluidounce of distilled water in a glass vessel; boil till all is dissolved, adding water to keep the quantity of the solution at one fluidounce. To two and a half drachms of the solution add twenty grains of sulphate of quinia, previously dissolved in distilled water by boiling. The arsenite of quinia precipitates in the form of a white, amorphous substance, which must be well washed and dried. Alcohol dissolves it but not water. Its dose is one-fourth of a grain every six hours, gradually increased to one-third of a grain every three or four hours.—*Prov. Med. and Surg. Jour., Aug.*, 1847.

*FERRI ARSENIAS. *Arseniate of Iron.*—To a solution of sulphate of iron, add a solution of arseniate of potassa (or soda) as long as a white precipitate falls. Wash the precipitated arseniate of iron on a filter and dry it. It is tasteless and insoluble in water, but easily soluble in nitric or muriatic acid. Carmichael applied this as a caustic to cancerous ulcers in the following form: Take of arseniate of iron one part, phosphate of iron four parts, spermaceti cerate twelve parts; triturate together. Biett has used it in herpetic, scrofulous, and cancerous affections, in doses of one-sixteenth of a grain, once or twice a day, in pill form, thus: Take of arseniate of iron three grains, powdered marsh-mallow half a drachm, extract of hops two drachms, simple syrup a sufficient quantity; beat well together and divide into forty-eight pills.

BARIUM. Ba=69.—Barium is the metallic basis of the alkaline earth *baryta.* It is a solid metal of a silvery color, melts at a temperature below redness, and is not volatilized by a heat capable of melting plate glass, but at that temperature its acts violently upon the glass, probably decomposing its alkali. Exposed to the air it rapidly tarnishes, absorbs oxygen, and is converted into baryta or barytes. It sinks rapidly in water, decomposes it with great rapidity, hydrogen being evolved, and is converted into baryta. When strongly pressed it becomes flat, and appears to be both ductile and malleable.

Baryta, *barytes*, also called *heavy earth*, " terra ponderosa," is the protoxide of barium, and is formed when barium has been put into water. It was discovered in 1774 by Scheele. It may be procured from the native sulphate of baryta or ponderous spar, by mixing this in very fine powder with one-eighth its weight of powdered charcoal, keeping it at a red heat for some time in a crucible; dissolving the sulphuret of baryta thus formed in nitric acid, filtering the solution which is a nitrate of baryta, sulphur being deposited, and slowly evaporating the filtered liquid till it crystallizes. Place the crystals of nitrate of baryta in a crucible, and drive off the nitric acid by a strong heat gradually applied. Baryta is a grayish-white, porous body, having an acrid alkaline taste, no smell, an alkaline reaction, and when taken into the stomach proves a most violent poison. Its formula is $Ba\,O$, equivalent weight 77, and sp. gr. 4.73. In the air it attracts moisture, swells with heat, and falls to a white powder. It slakes with water like quicklime forming a hydrate; and water dissolves .05 parts its weight of baryta, forming the test for sulphuric and carbonic acids, known by the name of *baryta water.* It forms several salts used in medicine and pharmacy.

BARYTÆ CARBONAS. *Carbonate of Baryta.*—Also called *Witherite* after Withering, who first found it native in 1783, though previously examined by Bergmann. It is found in Hungary, Sicily, Siberia, Neuberg in Stiria, etc., but occurs in considerable quantity in veins along with lead ore in different parts of England. It may be prepared artificially by exposing baryta water to the air, or by passing carbonic acid gas into it; in either case the carbonate precipitates in the state of a white powder. The native carbonate occurs in masses, stalactitic, and crystallized in six-sided prisms formed by the intersection of three primary right-rhombic prisms. It is poisonous, has no sensible taste, and, when native has the sp. gr. 4.331; when artificial it scarcely exceeds 3.763. Cold water dissolves $\frac{1}{4304}$ part, and boiling water $\frac{1}{2304}$ part of this salt; it is unalterable in the air, and when exposed to a blowpipe heat it fuses, evolving much light, losing carbonic acid, and presenting the appearance of white enamel. It is dissolved by the mineral acids with effervescence. One equivalent of carbonic acid, and one of baryta enter into its composition, $Ba\,O\,CO_2 = 99$. Its principal use is in the preparation of chloride of barium.

BARYTÆ NITRAS. *Nitrate of Baryta.*—This salt was formed immediately after the discovery of baryta, and may be prepared by dissolving native carbonate of baryta in nitric acid; or by decomposing sulphuret of baryta by means of nitric acid, filtering, evaporating, and crystallizing. It crystallizes in transparent permanent octahedra and tetrahedra, is odorless, of a pungent, and slightly bitter taste, soluble in fourteen parts of water at 60° F., in three parts of boiling water, and slightly soluble in alcohol. Heat fuses it, with decrepitation; a strong heat drives off the nitric acid, and leaves pure baryta. Fire-work makers use it to communicate a green tinge to flame. It is employed in chemistry and pharmacy, in solution as a test for sulphuric acid and sulphates, instead of the chloride of barium, when it is considered desirable to avoid the presence of a metallic chloride. The solution is made by dissolving one grain of the nitrate in twenty parts of distilled water, and keeping the solution in well closed bottles.

BARYTÆ SULPHAS. *Sulphate of Baryta.*—This salt was discovered by Scheele in 1744; its nature was first ascertained by Assessor Gahn. It occurs in considerable quantity, chiefly in veins, and very frequently accompanies galena and gray copper ore; it is also frequently prepared artificially. It often occurs in right-rhombic prisms. Its color is white or flesh-red; it is brittle, commonly in plates, of sp. gr. 4.41 to 4.67, odorless, tasteless, is not easily fused, is insoluble in nitric acid, and requires 43,000 times its weight of water at 60° F. to dissolve it. Heated suddenly it decrepitates; a violent heat, equal to 35° Wedgewood is required to melt it, when it is converted into a white opaque globule. Ignited in powder with charcoal it becomes changed into sulphuret of barium, evolving sulphureted hydrogen on the addition of hydrochloric acid, and forming a solution of chloride of barium. It is composed of one equivalent each of sulphuric acid, and baryta $BaO\ SO_3 = 177$. The several salts of baryta are generally prepared from it.

BARII CHLORIDUM. *Chloride of Barium.*—This salt is easily obtained by dissolving carbonate of baryta in diluted hydrochloric acid, evaporating the solution, so that on cooling crystals may form. Or it may be prepared by mixing powdered sulphate of baryta with one-fourth its weight of charcoal, heating the mixture in a covered crucible for three hours at a low white heat; powdering the product, stirring it well with fifteen parts of water, boiling, filtering, and adding to the filtered liquor hydrochloric acid in small portions at a time until effervescence ceases, and the solution is neutral to test paper; again filter, evaporate, and set aside to form crystals. In this latter process be careful not to inhale any of the sulphureted hydrogen gas which escapes on the addition of the hydrochloric acid. Chloride of barium forms transparent right-rhombic tabular crystals, generally flattened at the corners, odorless, of an unpleasant, sharp, amarous taste, permanent in the air, soluble in two and a half parts of cold and one and a half of boiling water, insoluble in strong alcohol, and of sp. gr. 3.097. When heated they lose their water of crystallization, and at a red heat fuse to a clear liquid. If the salt attracts moisture from the air it contains chloride of calcium; this is proved by shaking the finely powdered salt with absolute alcohol, which dissolves any chloride of calcium or strontium present, filtering, evaporating the filtrate, treating the residue with water, and then with dilute sulphuric acid; a precipitate denotes *strontium*, this is filtered off, and after saturating the filtrate with ammonia, oxalate of ammonia is added, and any turbidity caused by it is due to *lime*. The solution of chloride of barium must be so thoroughly precipitated by sulphuric acid as to yield no residue on evaporation; should there be a permanent one on heating, it is due to impurities. A blue precipitate with ferrocyanuret of potassium denotes *iron;* with ammonia a white precipitate disappearing on the addition of sal ammoniac from *magnesia*, the chloride of which like that of calcium deliquesces in the air, and may also be a cause of the moisture of the chloride of barium. A blue color caused by the ammonia arises from *copper*. Chloride of barium is *incompatible* with the alkaline and metallic sulphates and nitrates, the phosphates and carbonates. It is composed of one equivalent of barium, one of chlorine, and two of water, $Ba\ Cl = 104.5 + HO_2 = 18 = 122.5$.

In large doses this salt is a violent poison, affecting the nervous system chiefly. In small doses it is said to be useful in scrofula, dropsy, scirrhous affections, bronchocele, etc. It is used in solution, both externally and internally, one part of the chloride being dissolved in eight parts of distilled water, and administered in doses of ten drops, two or three times a day, gradually and carefully increased until nausea or giddiness is experienced. It has been used as a lotion in herpetic eruptions, and a collyrium in scrofulous ophthalmia, but its external use must be conducted with caution, as it is easily absorbed. When taken in poisonous doses, its antidotes are the sulphates, as sulphate of magnesia with a free use of well or spring water, and evacuating the stomach as soon as possible; together with other treatment indicated by the symptoms present.

Chloride of barium, in solution, is employed as a test for sulphuric acid or the sulphates in solution, with which it forms a white insoluble precipitate of sulphate of baryta.

*BARII IODIDUM. *Iodide of Barium.*—This salt may be obtained by dissolving carbonate of baryta in hydriodic acid; or, by Magendie's formula: Take iodine 100 parts, iron filings 30 parts, water a sufficient quantity; form an iodide of iron, to which add a solution of baryta one part, in distilled water 20 parts, and continue it as long as a precipitate occurs; heat for a few seconds, filter the solution, concentrate by evaporation, and crystallize. It crystallizes in fine, acicular prisms, which are very soluble in water, and but feebly deliquescent. When long exposed to the air, a portion of the hydriodic acid is decomposed and dissipated, carbonate of baryta is formed, and hydriodate of baryta colored by iodine may be dissolved by water. It is a violent poison requiring great caution in its use. Jahn recommends it as a powerful alterative, resolvent, and liquefacient, in scrofulous enlargements, hypertrophy, etc. The dose is one-eighth of a grain, very cautiously increased to one grain, three times daily, dissolved in distilled water. As an application to scrofulous tumors Biett recommends an ointment, made by triturating two grains of the iodide of barium with half an ounce of lard; applied by friction.

CADMIUM. $Cd=64$.—This metal was discovered by Stromeyer, and Hermann, about the year 1818. It usually occurs associated with the oxide of zinc, from which it has to be separated. Cadmium has a white color, with a slight bluish-gray tinge, is soft, very malleable, crystallizes in regular octohedrons, is very fusible, melting before it becomes red hot, and at a temperature somewhat higher than the boiling point of mercury, it is volatile, collecting in drops and crystallizing as it cools. One or two of its salts have been used in medicine.

*CADMII IODIDUM. *Iodide of Cadmium.*—Cadmium combines readily with iodine, either by heating the two substances together, or by boiling them in water till a solution is obtained. By evaporating this solution the iodide of cadmium crystallizes in six-sided prisms. They are white, with a pearly, metallic luster, transparent, permanent in the air, and melt very easily. Strongly heated, the iodine is driven off. They are soluble in water and alcohol, from which solutions they are precipitated by the alkaline carbonates, furnishing carbonate of cadmium. With starch and chlorine they give a blue color, and with sulphureted hydrogen, a yellow precipitate. They consist of one equivalent, each, of iodine and cadmium, $Cd\,I=190$. Iodide of cadmium has been used as a substitute for iodide of lead, in external applications. It is said to produce the same beneficial effects as the latter agent, without any of its deleterious effects. It may be dissolved in glycerin, and applied by friction, in order to produce any effect. An ointment has been found very useful in chilblains, some forms of cutaneous disease, chronic inflammatory affections of the joints, various forms of nodes, scrofulous tumors, etc., composed of one part of iodide of cadmium to eight parts of lard.

* CADMII SULPHAS. *Sulphate of Cadmium.*—This salt may be obtained by dissolving carbonate of cadmium in dilute sulphuric acid, and evaporating the neutral liquid so that it may crystallize;—or, by dissolving seven parts of cadmium in a mixture of six and a half parts of sulphuric acid, fifteen parts of water, and a small portion of nitric acid. Evaporate the solution to dryness, dissolve the residuum in distilled water, filter, and evaporate to form crystals. This salt crystallizes in large transparent rectangular prisms, similar in appearance to sulphate of zinc. They are very soluble in water, effloresce strongly when exposed to the air, lose their water of crystallization at a low heat without fusing, and at a strong red heat are changed into tabular crystals of subsulphate of cadmium, which are not very soluble in water. Their taste is astringent. Their formula is $Cd\ O\ SO_3 = 104$. The effects of sulphate of cadmium on the system are said to resemble those of sulphate of zinc, but ten times more active. Internally, half a grain has produced a copious flow of saliva, nausea, vomiting, and pain. It has been recommended as an irritant and astringent topical application in affections of the eye, specks and opacities of the cornea, etc. As an application in chronic ophthalmia from half a grain to four grains may be dissolved in a fluidounce of water; in otorrhea the solution may be made of double the above strength. In specks on the cornea, an ointment has been used, composed of one or two grains of the sulphate to four scruples of prepared lard.

CUPRUM. *Copper.*—This metal appears to have been known even before the time of Moses. It exists abundantly in different parts of the earth, and is found in a great variety of states, but principally in the form of *copper pyrites*, and *gray copper ore.* Pure copper is a reddish, brilliant, ductile, and malleable metal, of a nauseous, styptic taste, a peculiar disagreeable odor, harder than silver, fusing at 1996° F., and on cooling crystallizing in regular octohedrons and cubes. It is combustile, is readily oxidated on exposure to the air, has the specific gravity 8.86 to 8.94, and the symbol $Cu = 32$. It affords several medicinal agents; the subacetate of copper, and the sulphate have already been treated upon.

CUPRI AMMONIO-SULPHAS. *Ammoniæ Cupro-Sulphas. Ammoniated Copper. Cupro-sulphate of Ammonia.*—This salt is prepared by rubbing together until effervescence has ceased, one ounce of sulphate of copper with an ounce and a half of sesquicarbonate of ammonia; then roll up the residue in bibulous paper, and place it on a porous brick. When dry, let it be inclosed in a well-stopped bottle. Cupro-sulphate of ammonia forms either a deep blue crystalline powder, or similarly colored long flat prisms and needles, having an odor of ammonia, and a nauseous, metallic taste. It dissolves in one and a half parts of cold water, but is decomposed in a large quantity, a pale blue powder, subsulphate of copper, being precipitated; excess of ammonia will prevent this. Exposed to the air, it loses its ammonia, leaving a green powder, which being carefully heated, leaves a white residual powder remaining, the neutral sulphate of copper. Acids, arsenic, lime-water, and the fixed alkalies, form precipitates with a solution of the cupro-sulphate of ammonia. It is composed of two equivalents of ammonia, and one, each, of oxide of copper, sulphuric acid, and water, $NH_3\ Cu\ O + NH_3\ HO\ SO_3 = 123$. It is said to be a tonic, and has been used in chorea, hysteria, epilepsy, spasmodic asthma, and cramp of the stomach, in doses of from half a grain, two or three times a day, cautiously increased to five grains. It is generally given in pill form, with crumb of bread and carbonate of ammonia. In solution (a drachm of the salt to a fluidounce of water) it has been used as an application to indolent ulcers to stimulate them; and still further diluted, to the eye, to remove slight specks on the cornea. In large doses it produces vomiting, purging, weakness, tremblings, and paralysis; the antidotes are the same as named for poisoning by sulphate of copper.

* CUPRI CHLORIDUM. *Chloride of Copper.*—This may be procured by mixing together *seven parts* of powdered Chloride of Potassium, and *eleven and a half* parts of Sulphate of Copper; adding to the mixture, gradually, *twelve parts* of boiling Water, filtering when cool, evaporating the filtrate to form crystals, and drying them on bibulous paper. The salt is deposited in rectangular prisms of a fine grass green color. It is exceedingly acrid and caustic, has the specific gravity 1.67, is very soluble in water, attracts moisture from the air forming an oily liquid, fuses at a moderate heat, becoming solid when cold, and consists of one equivalent each of copper and chlorine, and three of water. In doses of from two to ten grains it is said to be useful in epilepsy, in the form of pill or solution. The solution may be used externally for the same purpose as that of the nitrate of copper.

* CUPRI NITRAS. *Nitrate of Copper.*—Dissolve small pieces of metallic copper in nitric acid specific gravity 1.20, until the metal is no longer acted upon; allow the solution to settle, decant or filter, and slowly evaporate on a sand-bath to dryness. Nitrate of copper forms either a pale blue crystalline powder, or deep blue rhombic prisms, of specific gravity 2.174, a feeble nitric acid odor, a nauseous, pungent, metallic taste, and an acid reaction. They deliquesce in the air, are very caustic, corroding the skin with great energy, are soluble in water or alcohol, and fuse when heated, parting with water and nitric acid, and leaving a green basic salt, which still further heated becomes pure oxide of copper. This salt has been used as a caustic to ulcers of various parts, as well as of the tongue and throat; the ulcer must first be dried, then apply the caustic, and then cover the part with sweet oil.—*Braithwaites' Retrospect, XXV.*, 201.

HYDRARGYRUM. *Mercury* or *Quicksilver.*—Mercury often occurs in a native state, but it is met with more abundantly in the form of cinnabar, or sulphuret of mercury; it is also met with in combination with silver. The process for obtaining pure mercury from its sulphuret is very simple; the cinnabar ore is mixed with half its weight of lime, and then distilled in iron retorts. Mercury distills over, and the sulphuret of lime remains in the retort. At Almaden, in Spain, the ore is roasted, by which the sulphur is converted into sulphurous acid, and the mercury is volatilized. Mercury is a heavy, fluid metal, odorless, tasteless, of a whitish color, like tin or silver, and quite brilliant. Its symbol is Hg, its equivalent weight 100, and its specific gravity 13.568. It freezes and becomes solid at 38° 66′, crystallizing in needles and regular octohedrons, being malleable, ductile, and tenacious, and having the specific gravity 14.391. It boils at 660° F., and produces an invisible elastic oxidized vapor, having the specific gravity 6.976. It is not altered by being kept under water, but its surface becomes gradually tarnished when exposed to the action of the air, becoming covered with a black oxide. It is slightly volatile even at the ordinary temperature; nitric acid dissolves it at 60° F.; concentrated sulphuric acid only when heated; while hydrochloric acid does not act upon it. Mercury combines with bromine, chlorine, iodine, oxygen, lead, phosphorus, sulphur, bismuth, arsenic, etc., forming compounds, some of which have been used in medical practice; it dissolves tin and cadmium very readily. Gold, silver, tin, etc., combine with it when cold, forming alloys called *amalgams*. Mercury does not decompose water; but if boiled in this liquid it absorbs $\frac{1}{500}$th of its weight, however, without becoming heavier, for water dissolves a small quantity of it, and thus acquires medicinal properties. Triturated with fat, or agitated for a length of time with water, it is divided to such a degree as to lose its metallic luster, and then forms a blackish powder, which is this metal in a state of great division. Mercury in combination with other substances may be detected by dissolving the substance in nitric acid; in the solution place a piece of bright copper, and after some time remove it, and rub it with clean paper, when, if mercury be present, a silvery stain will be found on the copper, which is removed by heat, and may be collected in a minute globule of quicksilver if the volatilization be conducted in a small glass tube. A globule of mercury moved gently along a sheet of paper, leaves no stain or trail. If a strong solution of iodide of potassium be added to a minute portion of any of the salts of mercury, placed on a clean bright plate of copper, the mercury is immediately deposited in the metallic state, appearing as a silvery stain on the copper, which can not be mistaken, as no other metal is deposited by the same means. The solution of mercury previous to the application of the test, must be concentrated by evaporation.—*A. Morgan. Pharm. Jour. and Trans.*, *XI.*, 372.

In the metallic state mercury is inert as a medicine, except when in a state of minute division; but its oxides and compound preparations possess active properties. Almost all the mercurial preparations act in the same way, possessing sialagogue, deobstruent, alterative, etc., properties, the character and degree of which are frequently diminished or augmented by the peculiar agents in combination with it. When long continued, and, in many instances, a few doses with some very susceptible constitutions, induces a succession of very serious symptoms, as emaciation, general debility, œdema, tremor of the limbs, diseased liver, pain in the bones, caries, palsy, ulcerations of the pharynx and other parts, gangrenous ulceration of the mouth and face, and a sort of scorbutic marasmus. It likewise occasionally produces a febrile condition of the system, profuse perspiration, several forms of cutaneous disease, as eczema, herpes, inflammation or congestion of the eye, fauces, or peritoneum, nodes, enlargement of the inguinal, axillary, mesenteric, parotid, pancreatic, etc., glands, together with various painful and nervous attacks. It was introduced into the medical profession by that notorious quack of former years, Paracelsus. Mercury in minute division, and many of its different preparations have been, and are still used in medicine, in the treatment of various forms of disease, and which will be referred to hereafter. Its *modus operandi* is not positively known.

In the bodies of persons, who, during life had employed mercury or some of its preparations, either internally or externally, metallic mercury has been found, as in the bones, brain, pleura, liver, cellular tissue, lungs, kidneys, etc. It has also been detected in the secretions of patients who were under its influence, as in the perspiration, urine, saliva, bile, gastro-intestinal secretions, and in the fluids of ulcers; when in the blood, it is very difficult to be detected by the ordinary tests, the most certain mode of procuring it, when present in this fluid, being by destructive distillation.

The salivation and gangrenous inflammation of the mouth occasioned by mercurials are best overcome by astringent infusions, both taken internally and used as a gargle, and the administration of chlorate of potassa. Its constitutional effects are best remedied by vegetable alteratives with iodide of potassium, tonics, attention to the excretions, malic acid, exercise, etc.; though it is rarely the case that a perfect recovery of health ensues where the system has suffered considerably from the effects of the mineral.

HYDRARGYRI ACETAS. *Acetate of Mercury.*—Dissolve *one part* of Protonitrate of Mercury in *six parts* of Distilled Water slightly acidulated with Nitric Acid, then add a solution of Acetate of Potassa acidulated by Acetic Acid, filter, wash the precipitate and dry it. It forms in rectangular tables and plates, having their angles frequently truncated. They are white, but become black on exposure to light, are inodorous, of an acrid, metallic taste, and almost insoluble in water or alcohol. Heat decomposes it. It consists of one equivalent, each, of suboxide of mercury and acetic acid, $Hg_2\,O\,A{=}259$. It has been occasionally used in syphilitic affections in doses of from one to five grains. One or two grains dissolved in water, has been used as a wash in obstinate cutaneous affections.

HYDRARGYRI AMIDO-CHLORIDUM. *Amido-Chloride of Mercury.*—This salt has also received the names of *Ammoniated Mercury*, *Ammonio-Chloride of Mercury*, *White Precipitate*, *White Oxide of Mercury*, etc. It is prepared by dissolving *one part* of Bichloride of Mercury in *thirty parts* of pure Water, in an earthen dish (if hot water has been used, the solution must be allowed to cool perfectly), and caustic Solution of Ammonia added so long as a precipitate is caused. $1\frac{1}{3}$ parts of ammoniacal solution, sp. gr. 0.960, effect this entirely. After standing 24 hours, pour off the liquor, collect the precipitate, and dry it. The precipitate, previous to drying, is to be washed until the washings are free from taste; continued washing decomposes the salt. If the salt were not washed at all, it would not be injured in its properties, as the muriate of ammonia, to remove which the washing is designed, is present only in trifling amount. Amido-chloride of mercury is a snow-white, inodorous mass, possessing a nauseous metallic taste. It is insoluble in alcohol, in about 600 parts of water, and readily soluble in sulphuric, nitric, and hydrochloric acids. Heat volatilizes it without fusing, forming ammonia, nitrogen, calomel, and water. Fixed alkalies and alkaline earths cause the evolution of half its ammonia, and color it yellow. Caustic ammonia does not alter it. When lime is added to it, heat does not entirely volatilize it. It is composed of two equivalents, each, of mercury, and hydrogen, and one equivalent, each, of chlorine and nitrogen, $Hg\,Cl{+}NH_2\,Hg{=}Hg\,Cl,\,Hg\,Ad\,{=}251.5$. White precipitate is used externally only, in herpes, impetigo, porrigo, and other affections of the skin, and in ophthalmia tarsi. One part of the salt to twelve parts of lard, or simple cerate, forms an ointment for application in the above-named maladies.

*HYDRARGYRI BORAS. *Borate of Mercury.*—Rub together *eleven parts* of the Subchloride of Mercury and *thirteen parts* of Borate of Soda for about fifteen minutes, then add small quantities of water from time to time, continuing the trituration throughout; then filter, wash the precipitate till the washings are tasteless, and dry. Recommended as a substitute for calomel, in doses of two grains daily, increasing gradually.

*HYDRARGYRI BROMIDUM. *Bromide of Mercury.*—To a weak solution of protonitrate of mercury add a solution of bromide of potassium so long as a precipitate falls; filter, wash, and dry by a gentle heat. It forms a white powder resembling calomel, consisting of one equivalent of bromine, and two equivalents of mercury. This is given for the same purpose as the iodide of mercury, in doses of one grain per day, gradually increased. A *bibromide of Mercury* is made by mixing together equal parts of mercury and bromine; sublime the white powder formed by the mixture. It is white, soluble in water, alcohol, or ether; its solution gives a red or yellow precipitate with alkalies; and nitric or sulphuric acid decomposes it with evolution of vapors of bromine. It consists of one equivalent, each, of mercury and bromine. It is a powerful poison, and has been recommended in syphilis, lepra, etc., in doses of one-twentieth of a grain, gradually increased to one-fourth. It may be given in pill, or dissolved in ether.

HYDRARGYRUM CUM CRETA. *Mercury with Chalk.*—This is prepared by triturating together *three parts* of Mercury, and *five parts* of Prepared Chalk, continuing the trituration until the mercurial globules are no longer visible. In this preparation the mercury becomes minutely divided, with, perhaps, a conversion of some of it into a mercurial protoxide. It forms a powder of a gray color, which effervesces when dilute acetic acid is added to it, forming a solution of lime, which may be detected by the usual tests for this substance; the insoluble precipitate is dissolved by dilute nitric acid, and consists principally of mercury. This salt is used as a laxative, cholagogue, and alterative, though it produces all the deleterious constitutional effects of mercury, by continued use. It has been used in biliary derangements, strumous diseases, syphilis in infants, diarrhea, etc. The dose for an adult is from five to ten or twenty grains, one or two times daily; to children from one to three grains. It may be given alone, in powder, or in combination with rhubarb, carbonate of soda, or other compatible agents. HYDRARGYRUM CUM MAGNESIA. *Mercury with Magnesia*, is used in the same doses and for the same purposes as the preceding compound. It is prepared by triturating together, the same as in the above, *one part* of mercury, with *two parts* of carbonate of magnesia.

HYDRARGYRI CYANURETUM. *Cyanuret of Mercury.*—This is best prepared by dissolving in *sixteen parts* of Water, in a glass flask, *two parts* of crystallized Ferrocyanuret of Potassium, and then adding *three parts* of dry Persulphate of Mercury. Boil for half an hour in a sand-bath, filter, and evaporate to dryness, stirring constantly. Powder the dried mass, digest it with eight times its weight of alcohol, 80 p. ct., for some hours, filter while hot, wash the residue on the filter with hot alcohol, and set aside to crystallize. Collect the crystals, evaporate the mother-liquor to dryness, and preserve the whole in a well-closed bottle excluded from the light. This mode forms a much purer salt than that ordinarily pursued with Prussian blue and the red oxide of mercury. Cyanuret of mercury forms white, more or less transparent, four-sided prisms and pyramids, which are odorless, but have a pungent, nauseous, metallic taste. Heated in a closed glass tube, the crystals fly in pieces, and decompose into cyanogen and mercury; a black carbonaceous mass is also formed at the same time, *Paracyanogen.* Water at 60° F. dissolves one-eleventh part of its weight of the salt; at 212° F., two-fifths its weight; alcohol of 80 p. ct. dissolves one-twentieth its weight of the salt, and one-fifth when boiling. This salt is not decomposed by aqueous solutions of the oxygen acids, nor by the aqueous solutions of alkalies. Its formula is $Hg+C_2N=Hg\,Cy$. It is a corrosive poison, but has been used in venereal diseases, humid squamous tetters, porrigo, and other cutaneous diseases, as well as in some chronic inflammations. Its dose is from one-sixteenth to one-eighth of a grain, in pill form, with opium and crumb of bread. An ointment for external application in skin diseases, etc., may be made by rubbing together cyanuret of mercury sixteen grains, with lard one ounce, oil of lemon fifteen drops.

HYDRARGYRI DIPERNITRAS. *Bibasic Nitrate of the Oxide of Mercury.* $2\,HgO\ NO_5 = 270$.—Prepared by boiling mercury in strong nitric acid until the liquid, when diluted with water, ceases to yield a white precipitate (calomel) on the addition of a solution of common salt. Then concentrate until it has the sp. gr. 3.47. This liquor has an acrid metallic taste, and colors the skin, when exposed to light, purplish red. By evaporation, crystals of the bibasic nitrate are formed, $2\,Hg\,O\,NO_5\ 2\,HO$. If the crystals be washed with cold water as long as it gives an acid reaction, a heavy yellow powder is obtained, which is the tribasic nitrate of the oxide of mercury, $3\,Hg\ O\ NO_5\ HO$; this when boiled in water, yields a brick-red powder, which is the sexbasic nitrate of the mercurial oxide, $6\,Hg\,O\,NO_5$. The bibasic nitrate of oxide of mercury is acrid and caustic, more so than the nitrate; and exerts an influence upon the system similar to that of corrosive sublimate, into which salt it becomes converted by the action of the alkaline chlorides in the alimentary canal. It is now seldom used, except as an ointment, and acid wash.

EMPLASTRUM HYDRARGYRI. *Plaster of Mercury.*—Melt together *one ounce* of Resin and *nine fluidrachms* of Olive Oil; when cool add Mercury *three ounces*, and triturate till its globules disappear; then add to the mixture, previously liquefied, Lead Plaster *six ounces*, and mix the whole thoroughly. This plaster has been used as a stimulating discutient to glandular swellings, syphilitic enlargements, etc., and to produce a mercurial therapeutical influence when applied locally, as over the liver or spleen, in chronic disease of these organs.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. *Plaster of Ammonia with Mercury.*—Take of Ammoniac Plaster *four ounces*, and mix it thoroughly with Mercurial Plaster *eight ounces*, by means of a steam or water bath, stirring constantly until the mixture stiffens on cooling. This is a more active preparation than the preceding, and is used in the same cases. It frequently excites an eczematous eruption, and has caused salivation.

*HYDRARGYRI ET QUINIÆ CHLORIDUM. *Chloride of Mercury and Quinia.*—Take *one part* of the Bichloride of Mercury, and *three parts* of Muriate of Quinia. Dissolve each, separately, in the least possible quantity of water, mix the solutions, filter, and dry the precipitate by a gentle heat. This has been used in obstinate cutaneous diseases, and in cases where it is desirable to produce the influence of quinia and mercury. The dose is from half a grain to a grain, every four or six hours, in pill form with opium and crumb of bread.

HYDRARGYRI NITRICO OXIDUM. *Nitric Oxide of Mercury. Red Precipitate.*—This preparation, also known as *Hydrargyri Oxydum Rubrum, Peroxide* or *Red Oxide of Mercury, Deutoxide of Mercury*, etc., is obtained by dissolving Mercury *three pounds* in Nitric Acid *eighteen fluidounces*, Distilled Water *two pints*, with the aid of a gentle heat. Boil down the liquor, and rub what remains to powder. Put this into another very shallow vessel, and apply a gradual heat until red vapors cease to rise.—*Lond.* In this instance nitrate of mercury is first formed, and then decomposed by the aid of heat, though a portion of nitrate remains; to remove the whole of the nitric acid would cause the mercury to sublime, from the amount of heat necessary.

Wittstein recommends to digest Mercury *one part*, in a glass bottle, on a sand-bath, with *three parts* of Diluted Nitric Acid, sp. gr. 1.20, until the Mercury is all dissolved. Pour the solution into a porcelain dish, and evaporate with continued stirring over an open fire, to dryness. Mix the dried yellowish-white mass with as much mercury as has been dissolved, then return it to the dish, and with continuous stirring, heat it over an open fire, at first gently, and then rather strongly until no more brownish-yellow fumes are evolved and the powder has a grayish-black appearance, which becomes red on cooling. The last traces of nitric acid are driven off with difficulty, and at the risk of reducing a portion of the oxide; consequently, in order to remove any traces of acid present, it is better when the powder has been heated to the point above mentioned, to allow it to cool, mix it with crystallized carbonate of soda, one-tenth the weight of the mercury employed, boil the whole with a measured quantity of water for half an hour, filter, wash the precipitate with warm water until all the alkali is removed, dry with a gentle heat, and keep in closely-stopped bottles excluded from the light. The yield is rather more than the weight of the mercury employed.

Red precipitate forms in masses or powder consisting of small scales of a bright orange-red color, forming a powder of a light yellow color when it contains water, or of a yellow-red, or brick-red color when it is anhydrous, inodorous, and of a caustic, metallic taste. Water dissolves traces of it, alcohol none; nitric and hydrochloric acids dissolve it readily. It is decomposed by light and heat. When heated it becomes black, but on cooling resumes its original red color; heated strongly it separates into oxygen which is given off, and mercury. It is frequently adulterated with oxide of lead, powdered brick, etc., which may be known by heating a portion of the oxide in a small retort or porcelain crucible; if pure the mercurial oxide is wholly volatilized; if any adulterations are present, these remain in the retort. Any contamination with nitric acid (as the basic salt) may be generally detected from the appearance of yellow grains, or the red vapors when heated; but the most certain test is to boil a portion of it with a solution of soda, filtering, supersaturating the filtrate with sulphuric acid and adding a drop of solution of indigo, the blue color of which will be destroyed on warming, if nitric acid be present. When red precipitate is dissolved in nitric acid, nitrate of silver does not affect it, unless a chloride be present. This salt is composed of one atom of mercury, and two of oxygen, $HgO_2 = 218$ (*Gregory*), or 116 (*Gmelin and Thomson*).

Red precipitate is a powerful irritant, and when taken internally, even in small doses, readily excites vomiting and purging; large doses cause gastro-enteritis. It is rarely employed internally on account of these dangerous effects, though it has been recommended in syphilitic diseases in conjunction with extract of conium, opium or morphia, etc. The dose of it is from $\frac{1}{16}$ to $\frac{1}{2}$ of a grain, combined with half a grain of opium, in pill form, to be repeated once or twice a day. It is principally used externally, as an escharotic and stimulant, to reduce fungous fleshy excrescences, to chancres, to excite certain syphilitic ulcerations, and indolent ulcers generally, and principally to reduce chronic ophthalmia, maintained by the ulceration of the free margin of the eyelids. One part of the finely levigated powder of red precipitate mixed with eight parts of simple ointment, forms a stimulating application to ulcers, chronic ophthalmia, some diseases of the skin, etc. Mackenzie recommends one part of the powdered red precipitate to be triturated with eight parts of white sugar, a portion of which may be blown into the eye, through a quill, in opacity of the cornea. In syphilitic ulceration of the throat, uvula, tonsils, etc., the following has been recommended as a fumigation. Mix together Red Precipitate *two drachms*, Frankincense, Myrrh, each, *two scruples*, Camphor *sixteen grains*. Throw a portion of this on a hot shovel, and inhale the vapor. It must be remembered that it is capable of being absorbed, and of producing very serious accidents.

HYDRARGYRI PERCHLORIDUM. *Perchloride of Mercury. Corrosive Sublimate.* Also known by the names, *Bichloride of Mercury*, *Chloride of Mercury*, *Corrosive Muriate of Mercury*, *Oxymuriate of Mercury*, etc. There are several ways by which this poison may be made, as follows:—

1. Mix *two parts* of dry Neutral Persulphate of Mercury in a porcelain mortar, intimately with *one part* of powdered and well dried Chloride of Sodium (common salt); shake the mixture into a glass flask, which should only be one fourth part filled, and sublime. The flask should be placed in an iron dish containing a very thin layer of sand, then surrounded with sand to half its depth, the whole put on a ring furnace, and heat applied. To prevent the glass from cracking, the fire must not be strong at first, but gradually increased. The heat must not be too great, otherwise a considerable portion of the sublimed salt would fuse and fall back again; and thus rather retard than facilitate the process. When no more white stellated groups of crystals appear on the surface of the powder at the bottom of the flask, the latter is withdrawn from the sand, cracked by touching with a wet sponge, and when cold the sublimate in the upper portion of the flask is separated from the glass, and kept in vessels excluded from light. The product is one and three-fourths parts. Instead of a glass flask, an iron pot lined with clay, and an earthen head placed over it may be used.

2. Mercury *six parts*, Hydrochloric Acid, sp. gr. 1.130, and Nitric Acid, sp. gr. 1.20, are mixed in a plain retort, the latter is placed in a sand-bath, a receiver attached without luting, and kept cool while the distillation is carried on to dryness. (The acids need not be chemically pure, but should they contain sulphuric acid, a little common salt must be added). When no more moisture forms in the neck of the retort, the receiver is exchanged for a dry one, the retort is buried as deeply as possible in the sand, and the heat continued until the salt is driven to the upper portion, and into the neck of it. The retort is then withdrawn from the sand, a wet cloth applied to the bottom, when cold the contents separated from the glass, and the product, which will be about eight parts, kept in a bottle excluded from the light.

3. Boil down Mercury *two pounds* with Sulphuric Acid *twenty-one and a half fluidounces* (Imperial measure) until the bipersulphate of mercury remains dry; rub this when it is cold with Chloride of Sodium *one pound and a half*, in an earthen mortar; then sublime with a heat gradually raised.

4. Thomson says the best and most simple process, is to dissolve the red oxide of mercury (red precipitate) in hydrochloric acid; the solution takes place readily, and without the disengagement of any gas; and the salt crystallizes spontaneously.

Perchloride of mercury when obtained by sublimation, forms in beautiful white semi-transparent masses, composed of very small prismatic needles. By evaporation, it yields cubes or rhomboidal prisms, or more commonly quadrangular prisms with their sides alternately narrower, and terminated by dihedral summits. It is odorless, has an extremely acrid, nauseous, and metallic taste which is very persistent, is unalterable in the air, and has the sp. gr. 5.14 to 5.42. It is soluble in sixteen parts of cold, and in three of boiling water, in two and a half parts of cold alcohol, and in three parts of ether; all of which solutions have an acid reaction. In the light it becomes reduced, first to proto-chloride, and finally to the metallic state. When heated, it fuses, volatilizes without being decomposed, and produces a white smoke of a penetrating smell. If there is a white residue in the aqueous solution of this salt which is blackened by ammonia or solution of potassa, calomel is present. Corrosive sublimate consists of one equivalent, each, of mercury and chlorine, $Hg, Cl=135.5$. Its *incompatibles* are alkalies and their carbonates, tartar-emetic, sulphuret of potassa, soaps, iron, copper, lead, metallic mercury, vegetable substances containing tannic acid, etc. Taken internally, corrosive sublimate acts as an active, caustic poison, producing in over-doses violent burning pain in the mouth, throat, esophagus and stomach; difficulty of swallowing; sense of suffocation; nausea, violent vomiting increased by every thing taken into the stomach; the pain soon becomes diffused over the whole abdomen, which becomes very sensitive to pressure; violent purging, often of blood; great anxiety; flushed and even swollen countenance; restlessness; pulse quick, small, and contracted; cold sweats; burning thirst; short and laborious breathing; urine frequently suppressed; and finally stupor, coma, convulsive movements, partial paralysis, or paraplegia, and death. Sometimes before death ensues there may be profuse salivation, ulceration of the mouth, fetor of the breath, and other secondary mercurial symptoms. On inspection after death the stomach and bowels will be found excessively inflamed, with sometimes patches of ulceration or gangrene.

In the treatment of cases of poisoning by corrosive sublimate, the antidotes must be given promptly, without the least delay. Thus the whites and yolks of eggs; milk; or a mixture of wheat flour, oat-meal, or barley-meal, and water; these form a compound whose chemical action on the tissues are slight when compared with that of the poison. One egg is said to be required for every four grains of corrosive sublimate swallowed. The above, as well as mucilaginous draughts should be given freely, until relief is afforded; and as soon as possible the stomach should be evacuated by the stomach-pump, and likewise be well washed out. Chemical antidotes, or those which decompose the poison, or form harmless compounds with it, should also be used, as a mixture of two parts of very fine iron filings, and one of fine zinc filings, which is said to reduce the corrosive sublimate to the metallic state; or, the hydrated sulphuret of iron, which completely destroys the poisonous quality of the mercurial salt, if given within ten or fifteen minutes after it has been swallowed. After the poisonous symptoms have been overcome, any inflammation which may remain must be treated on general principles.

As a therapeutical agent, corrosive sublimate has been employed as an alterative in cutaneous, scrofulous, and rheumatic diseases, nervous disorders, diseases of the bones, etc. In obstinate porrigo, acne, and other eruptions on the face, it is said to have proved beneficial. It is more generally administered in the treatment of syphilitic maladies. It is frequently added to vegetable alterative syrups, or conjoined with antimonials. Its dose is from one-sixteenth to one-eighth of a grain, made into a pill with crumb of bread, and associated with some preparation of opium, conium, or hyoscyamus, to prevent the nausea, griping, and purging which frequently attend its use. A *Solution of Bichloride of Mercury* may be made by dissolving ten grains, each, of corrosive sublimate, and hydrochlorate of ammonia in a pint of water (Imperial measure). Each fluidounce contains half a grain of corrosive sublimate; the dose of the solution varies from half a fluidrachm to two or three fluidrachms, taken in syrup or sweetened water. Hunter's Red Drop is from Marryatt's Therapeutics, and is composed of ten grains of corrosive sublimate dissolved in twelve drops of hydrochloric acid, to which one fluidounce of compound spirits of lavender is added; the dose is from five to twenty drops in water or white-wine, or sufficient not to purge the bowels. Antimonial wine may be substituted for the compound spirits of lavender.

Externally, corrosive sublimate has been used alone, or in conjunction with arsenious acid, or chloride of zinc, as an application to cancerous ulcers, obstinate and indolent ulcers, fistulous ulcers, chancres. It may be used in powder, solution, or ointment. The solution above named has been used as a wash in rosacea, scabies, lepra, psoriasis, and other skin diseases, venereal ulcers, syphilitic affections of the eyes, and diluted, in obstinate gleet as an injection. From half a grain to two grains of the mercurial salt rubbed up with an ounce of lard, forms an ointment, which has been found effectual in the contagious porrigo of the face and scalp which spreads among children in schools, as well as in other skin diseases. *Yellow Wash* (Lotio Flava), used as an application to venereal, scrofulous, and phagedenic ulcers, is prepared by adding two or three grains of corrosive sublimate to a fluidounce of lime-water. When employed, it should be well shaken, and used in the turbid state.

There are several *tests* for the detection of corrosive sublimate, with which the practitioner should be acquainted, as follows;—1. *Lime-water* produces with corrosive sublimate a lemon yellow precipitate of the hydrated red oxide of mercury. If the supernatant fluid be acidified with nitric acid, and then nitrate of silver be added, a white precipitate is obtained insoluble in excess of nitric acid.

2. Placed in a tube with an alkaline carbonate, and heated by a spirit-lamp, carbonic acid gas is evolved, and globules of mercury are deposited on the sides of the tube.

3. Caustic ammonia added to a solution of corrosive sublimate, causes a white precipitate of chloro amidide of mercury.

4. When a solution of corrosive sublimate is treated by an *Alkaline Monocarbonate*, a brick-red precipitate ensues; an *Alkaline Bicarbonate* causes opalescence, followed in a few minutes by a dark reddish precipitate; *Iodide of Potassium* causes a scarlet precipitate, soluble in excess, either of iodide of potassium or of corrosive sublimate; *Proto-chloride of Tin*, added in excess, causes at first a white precipitate of calomel, and afterward a grayish powder, composed of reguline mercury in a finely divided condition; *Hydro-sulphuric Acid*, in excess, causes a black precipitate—if the mercurial solution be in excess, a white precipitate—the former is a bisulphuret, and the latter a chlorosulphuret of mercury; *Ferrocyanuret of Potassium* causes a white precipitate of ferrocyanuret of mercury, which ultimately acquires a bluish tinge.

5. *The Galvanic Test.*—Place a drop or two of the suspected solution on a piece of gold, as a ring or a five-dollar piece, and then apply an iron key (or any small piece of polished iron) so that it will touch both the fluid and the gold at the same time; a galvanic current is at once established, the mercury attaches itself to the gold, or negative pole, while chloride of iron is formed at the positive pole on the piece of iron. The mercury stain left on the gold may be removed by heat.

6. A slip of bright copper dipped into a solution of corrosive sublimate,

previously acidulated with hydrochloric acid, acquires a coat of metallic mercury.

7. In *organic mixtures* undecomposed corrosive sublimate may first be sought for with ether—as ether dissolves the salt, and removes it from its aqueous solution, upon the top of which it floats. The ethereal solution yields the perchloride on evaporation, which may then be tested in aqueous solution, by the above reagents. Should this method fail, add protochloride of tin to the mixture as long as a slate gray precipitate is produced; dissolve the organic matter by boiling the whole in liquor potassa, then wash the detached mercury, collect it, and sublime. *C.*

See Taylor on Poisons, *Christison on Poisons*, and *Taylor's Medical Jurisprudence.*

HYDRARGYRI PERIODIDUM. *Periodide of Mercury*, also called *Deutiodide of Mercury*, *Biniodide of Mercury*, *Red Iodide of Mercury*, *Hydrargyri Iodidi Rubrum, etc.*—This salt is obtained most pure and beautiful by dissolving *five parts* of Perchloride of Mercury in *one hundred* parts of Water, and adding to it so long as a precipitate forms, a solution of Iodide of Potassium in *ten times* its weight of water; being careful that the precipitant is not in excess—generally about six or seven parts will be sufficient, according to its purity. Allow the precipitate to subside, in a dark place, wash it by repeated decantation, collect on a filter, dry by a very gentle heat, and keep it in a well closed bottle, free from access of light. By adding an excess of the precipitant, in this process, the periodide of mercury is readily dissolved, and in consequence is lost in washing; but, a slight excess insures the absence of corrosive sublimate in the product. Periodide of mercury is a tasteless, inodorous, brilliant scarlet powder, having the specific gravity 6.2 to 6.3. Heated in a test tube it becomes yellow, fuses to a brownish yellow liquid, and sublimes to a yellow crystalline mass, which acquires a red color partially on cooling, and entirely, either more or less gradually. It is dimorphous, its color and crystalline form varying with its temperature. Water dissolves only a trace of it. Alcohol, of 80 per cent., dissolves one one-hundred and twentieth of the salt in the cold, and one-twelfth at the boiling point. The hot saturated solution deposits yellow scales on cooling, which gradually become red. It is also soluble in nitric and hydrochloric acids, especially on heating, with the evolution of hydriodic acid and free iodine; the solution contains, according to the duration of the action. beside the iodide, variable quantities of perchloride and pernitrate; and, on cooling, deposits a portion of the periodide in a crystalline state. Iodide of potassium dissolves it with the greatest readiness, and thus quickly separates it from red lead, cinnabar, or substances having a similar appearance. If it be contaminated by persulphuret of mercury, a mixture of sulphuret and iodide of potassium is obtained when it is fused with caustic potassa in a glass tube; and sulphur may be detected by the sulphureted hydrogen odor evolved on the addition of a mineral acid. It consists of one equivalent, each, of mercury and iodine, Hg, I.=226.

Periodide of mercury is an active poison, nearly as powerful as corrosive sublimate. In doses of one-sixteenth of a grain, carefully augmented to one-fourth of a grain, it has been employed in syphilitic and scrofulous affections. It may be administered in pill form with crumb of bread and syrup; or dissolved in alcohol or ether, twenty grains to the fluidounce and a half of the menstruum employed—the dose of either is from five to twenty drops in distilled water. The ethereal tincture is somewhat more powerful than the alcoholic. Externally, a solution of it, six grains to a fluidounce of distilled water has been used as a lotion to scrofuloui and syphilitic ulcers, etc. An ointment composed of two grains of periodide of mercury, two scruples of cerate, and one scruple of almond oil, has been used in obstinate ophthalmia tarsi, with thickening of the meibomian glands, opacity of the cornea, obstinate venereal ulcers, chronic cutaneous diseases, etc. A drachm, each, of periodide, lard, and olive oil, has been successfully employed as a caustic application to lupus. It is to be used in very small quantities at a time, being careful to place it only on a limited amount of diseased surface, repeating its application about once in every week, and extending its action from one part of the disease to another, as the cure progresses. *Cazenave, Ann. de Therap., A. D.*, 1852, 175. A preparation has been recommended by Dr. Channing, called *Solution of Iodo hydrargyrate of Potassium*, which is said to be efficacious in chronic tuberculous affections, dyspepsia, chronic hepatitis and splenitis, ague-cake, anasarca, ascites, scrofulous and syphilitic diseases, leucorrhea, and menstrual derangements, some cutaneous affections, etc. It is prepared by dissolving seven grains of iodide of potassium in two fluidounces of distilled water, and then adding nine grains of periodide of mercury. There will be about sixteen grains of the iodohydrargyrate of potassium in this solution, with a slight excess of iodide of potassium. The dose is two, three or five drops repeated three times a day; it may be given largely diluted with water, or in some vegetable alterative syrup.

*HYDRARGYRI PERNITRAS LIQUOR. *Solution of Pernitrate of Mercury.* This solution is also known as the *Acid Nitrate of Mercury.* It is made by dissolving, with the application of heat, "pure Mercury *two ounces*, avoirdupois, in a mixture of pure Nitric Acid *one fluidounce and a half*, Imperial measure, and Distilled Water *one ounce and a half*, avoirdupois; evaporate the solution to the bulk of two fluidounces and a half, Imperial measure."—*Dub.* In the Parisian Codex, mercury four parts by weight are ordered to be dissolved in nitric acid, sp. gr. 1.32, eight parts by weight, and evaporate the solution to nine parts. This forms a thick, heavy, very caustic solution, which has been employed with some success in lupus, ulcerated cervix uteri, obstinate lepra, psoriasis, porrigo, herpes-exedens, etc., syphilitic and scrofulous ulcers. It is applied by means of a camel's-hair pencil to a surface not exceeding an inch in diameter, at any one time, and over this a pledget of lint is applied which has been previously dampened with some of the solution. It whitens the part at once, a kind of erysipelatous inflammation is induced in the neighboring parts, and a scab of a yellow color forms and falls off in three, four, or five days. In ulcerated cervix uteri, one application is said to have materially improved the character of the sore. As salivation has been caused by a single application, Mialhe proposes to prevent absorption of the mercury by washing the cauterized part immediately after the caustic has been applied.—*P.*

HYDRARGYRI PERSULPHAS. *Persulphate of Mercury. Sulphate of the Peroxide of Mercury.*—This salt is prepared by placing in a porcelain capsule, Quicksilver *ten ounces*, avoirdupois, in *six fluidounces* (Imperial measure) of commercial Oil of Vitriol; apply heat until effervescence ceases, and nothing remains but a white and dry crystalline salt.—*Dub.* The salt is a white opaque solid, which becomes orange-colored at a dull red heat, but white on cooling; at a full red heat it is decomposed. Water decomposes it resolving it into turpeth mineral and a supersalt. It consists of one equivalent, each, of mercury, oxygen, and sulphuric acid,

$Hg\,O\,SO_3 = 148$. It is not used as a medicine, but is employed in the manufacture of calomel, corrosive sublimate, and subsulphate of mercury.

HYDRARGYRI PROTONITRAS. *Protonitrate of Mercury. Neutral Nitrate of the Suboxide of Mercury.*—This salt is obtained by digesting excess of mercury in cold nitric acid until the short prismatic crystals ($Hg_2\,O\,NO_5 = 262$), are formed. If these be left in the solution, they are gradually dissolved and replaced by large yellow transparent prisms of the sesquibasic nitrate of the suboxide, while the acid liquor contains a soluble supernitrate. Protonitrate of mercury may be distinguished from other nitrates, by the white precipitate of calomel formed, when it is rubbed with excess of chloride of sodium, and water added afterward; if the liquid be filtered, no corrosive sublimate can be detected in it, unless some peroxide of mercury was along with the suboxide; and if any greenish powder is formed, basic nitrate of the suboxide was along with the neutral nitrate. Protonitrate of mercury, $Hg_2\,O\,NO_5 = 262$, is rarely used as a medicine, on account of its tendency to decompose. An ounce of the salt dissolved in half a pint of distilled water acidulated with three and a half scruples of nitric acid, and the solution made of sp. gr. 1.100, has been used as a mild caustic in venereal ulcerations and growths. Two parts of the salt to fifty of the lard, forms an ointment which has been used in lepra, psoriasis, etc.

† HYDRARGYRI PHOSPHAS. *Protophosphate of Mercury.*—This salt is made by triturating *eight parts* of dry Protonitrate of Mercury ($Hg_2\,O + NO_5 + 2\,HO$), in a porcelain mortar, with *sixteen parts* of distilled Water, in which is mixed *one part* of Nitric Acid, sp. gr. 1.20; to this is added about *sixty parts* of pure Water, and the whole gently warmed until dissolved, filtered if necessary, the clear solution diluted with *eight times* its weight of pure Water, and then treated with a solution of crystallized Phosphate of Soda so long as a precipitate is formed. Wash this carefully with water until it no longer gives an acid reaction, dry with a gentle heat, and keep in a closed bottle excluded from the light It is a white, fine, crystalline, odorless, and tasteless powder, with the formula $2\,Hg_2\,O + P_2\,O_5$. Heated it fuses, evolving oxygen and metallic mercury, and leaving a colorless glacial mass, which is the phosphoric acid with a trifling quantity of mercury. It is insoluble in water, but completely dissolved in nitric acid by the aid of heat. It has been highly spoken of as an efficacious remedy in secondary syphilis, in doses of half a grain or a grain in pill form. Phosphate of mercury four grains and a half, opium three grains, tartar emetic half a grain, formed into nine pills with a sufficient quantity of conserve of roses, has been used with advantage. One pill to be taken every night and morning.

HYDRARGYRI SUBCHLORIDUM. *Subchloride of Mercury. Calomel.* Also known by the names, *Protochloride of Mercury*, *Mercurius dulcis*, *Hydrargyri Chloridum mite*, etc.—This salt is prepared by various processes. One, *by the dry way*, is as follows: *Four parts* of Perchloride of Mercury are reduced, in a porcelain mortar, with a little spirit to keep down the dust, to a fine powder; *three parts* of Metallic Mercury are added to it, and the trituration continued until no more mercury globules are visible. The gray mixture is put into a flask, of which it should only fill one-third part, and the flask placed in an iron dish containing a very thin layer of sand, then surrounded with sand to half its depth, the whole put on a ring furnace and heat applied. For fear of the glass cracking, the fire must not be strong at first, but gradually increased. As soon as the sublimate condenses on the upper part of the flask, the mouth of the latter is carefully closed, to prevent loss. From time to time the covering is removed, the better to observe the process, and so soon as the bottom of the flask is empty, it is withdrawn from the sand, a wet sponge or cloth applied, in order to crack it, and when thoroughly cool the glass fragments separated from the sublimate, and the latter kept in a bottle, away from the light. The yield will be nearly seven parts.

By the moist way.—*Eight parts* of dry Protonitrate of Mercury ($Hg_2 O + NO_5 + 2 HO$) are rubbed in a porcelain mortar, with *sixteen parts* of pure Water, with which *one part* of Nitric Acid, sp. gr. 1.20, has been mixed; to this about *sixty parts* of Water are added gradually, the whole gently warmed in a glass flask until entirely dissolved, filtered if necessary, the solution diluted with *eight times* its weight of Water, and a solution of common Salt added as long as a precipitate is formed; nearly two parts of salt will be requisite for this. The precipitate, not exposed to the light more than necessary, is collected on a filter, thoroughly washed with pure water until the water loses all acid reaction, and a portion of it leaves no residue on evaporation, then dried with a gentle heat and but slight exposure to light. It will weigh six and a half parts. Hydrochlorate of ammonia will not serve for this precipitation, as on account of its tendency to form, with perchloride of mercury, a readily-soluble double salt, it causes, even in the cold, a partial decomposition of the precipitate into perchloride of mercury, and metallic mercury. Neither will hydrochloric acid serve for the precipitation, as the liberated nitric acid converts a portion of the precipitate into soluble perchloride and pernitrate of mercury. For some improvements in the manufacture of calomel, see *Am. Jour. Pharm., XV., pp.* 89, 93.

Sublimed calomel appears as a crystalline crust, consisting of four-sided prisms, of a white color, with a tinge of yellow, which, on scratching or rubbing, acquire a pale yellow color; the precipitated calomel is a perfectly white, amorphous powder. It is odorless and tasteless; heated, it becomes yellow, and volatilizes without fusing, forming white fumes; by repeated sublimations, it is partially decomposed into perchloride of and metallic mercury. Exposed to the light, it undergoes a similar decomposition, and acquires a gray color; by a protracted action of the light, the perchloride decomposes, chlorine is evolved, and the mercury with which it was combined remains as a gray powder. Its specific gravity varies from 7.14 to 7.2. Cold water does not dissolve a trace of calomel; hot water decomposes it, but only in a slight degree, into soluble chloride and metal; the water when filtered giving, with sulphuret of ammonia, a black precipitate. Alcohol behaves like water, but exerts a still greater decomposing action at its boiling point. Boiled for some time with hydrochloric acid, calomel dissolves, hydrogen being evolved, and perchloride of mercury formed. When boiled with nitric acid also, it entirely dissolves, nitric oxide is evolved, and forms in the air, hyponitric acid. Calomel consists of two equivalents of mercury and one of chlorine, $Hg_2 Cl = 235.5$.

Calomel of a gray color contains free mercury. If cold water which has been agitated with it some time gives, with sulphuret of ammonium, a black precipitate, it contains corrosive sublimate. In testing calomel for corrosive sublimate, it must not be treated with boiling water. When pure, calomel placed in a glass tube, and heated by a spirit-lamp, is completely volatilized, giving a white sublimate; any residue is impurity. Water or alcohol which has been digested on it, should occasion no precipitate or change of color on the addition of lime-water, caustic potassa, ammonia, nitrate of silver, or sulphureted hydrogen, and which indicates the absence of corrosive sublimate. Calomel in powders may be known by its becoming black when ammonia is added to it; if other matters are mixed with it, throw the powder on water, the calomel will sink to the bottom, collect it on a filter, wash, if necessary, and test with the ammonia. Pills may be treated by dissolving them in water, washing the precipitate as above to remove coloring matter, and test the white insoluble powder with ammonia.

Calomel is *incompatible* with the alkalies, lime-water, and sulphuret of potassa, which blacken it, forming the suboxide or black oxide of mercury, $Hg_2 O$; also with antimony, copper, iron, lead, etc. If calomel be given at the same time with either common salt, nitromuriatic acid, or the alkaline chlorides, it will be converted into corrosive sublimate, and may give rise to serious, if not fatal results. It should never be given in connection with articles containing hydrocyanic acid, either in a free or latent condition, as it may be converted into the bicyanuret of mercury and the perchloride.

Internally, calomel acts as a *purgative* in doses of from two to five grains; on account of its uncertainty of action, it is usually given in combination with other purgatives, as jalap, senna, scammony, colocynth, etc. It is used as a purgative in torpid states of the bowels, in torpor of the liver, deranged conditions of the biliary organs, jaundice, some febrile disorders, worms, dropsy, and in various disordered conditions of the alimentary canal unaccompanied by inflammation. Large doses of calomel, as one or two scruples every half-hour or hour, are said to act as a *sedative*, and have been administered in yellow fever, dysentery, Asiatic cholera, diseases of the liver, etc. As an *alterative* it has been exhibited in chronic cutaneous diseases, glandular affections, hepatitis, etc., in doses of from half a grain to a grain every day or two, as circumstances may require, with occasional doses of castor-oil, or some mild saline laxative to keep the bowels free. As a *sialagogue*, it has been used in various forms of disease, as all febrile and inflammatory, syphilis, chronic visceral diseases, etc., in doses of one, two, or three grains, every three or four hours, usually combined with Dover's powder, or some other opiate, when there is no condition of the nervous system contra-indicating the use of narcotics. Calomel increases the action of the secreting organs; when its use is continued for a long time, according to the susceptibility of the patient's system, it produces the constitutional effects of mercury. Sometimes it produces nausea, griping, and great faintness. Large doses are always dangerous, as the agent is very uncertain in its action at all times; I have known as small a dose as three grains cause phagedenic ulceration of the face and jaw. This kind of ulceration is by no means uncommon among patients under mercurial treatment. Combined with other remedies, calomel is said to increase their effects—hence, those who use it have combined it with antimonials to promote *diaphoresis;* and with squills to favor *diuresis* in dropsical affections. Externally, it has been used as a snuff combined with other substances, in nasal polypus, and diseases of the Schneiderian membrane; and blown into the eye, in chronic rheumatic and scrofulous ophthalmia, and spots on the cornea. One part of calomel to eight parts of lard, is said to form an excellent ointment in porrigo favosa, herpes, impetigo, lepra, psoriasis, and other chronic skin diseases. One drachm of calomel added to a pint of lime-water forms the *Black Wash* (Lotio Nigra), which is a favorite application, with some physicians, to all syphilitic ulcers. Sometimes the wash is made two or four times the strength of the above.

HYDRARGYRI SUBIODIDUM. *Subiodide of Mercury.*—Also known as *Protiodide of Mercury*, *Iodide of Mercury*, *Green Iodide of Mercury*, etc. There are several modes of preparing this salt; the London College orders of Mercury *one ounce*, rubbed together with Iodine *five drachms*, gradually adding a small quantity of alcohol, until globules are no longer visible. Dry the powder immediately, with a gentle heat, without the access of light, and keep in a well-stopped black glass bottle. Wittstein gives the following formula: Eight parts of mercury are triturated, in a porcelain mortar, with a few drops of alcohol and five parts of iodine, until the red colored mass which the mixture at first gives is converted into a dark yellowish-green powder, exhibiting no trace of metallic globules even under the magnifying glass. During the operation, the mortar should be covered with a black cloth, to prevent the action of the light. Sufficient alcohol is then added, constantly triturating, to convert it into a thin paste, this is thrown on a filter, and, excluding the light, washed with alcohol until on passing off, the latter no longer gives a black precipitate or turbidness with sulphuret of ammonium; the contents of the filter dried with a very gentle heat, and kept in a bottle away from the light.

Subiodide of mercury is a dark greenish yellow, odorless and tasteless powder, which is insoluble in water or alcohol, and soluble in ether; unalterable in the air, but decomposed by light, acquiring a gray appearance. Heated in a test tube it becomes at first reddish, separating into periodide and metallic mercury, then yellowish, fusing to a brown liquid, and finally volatilizing; the iodine passes off first, and then the mercury. Boiling hydrochloric acid dissolves it, but only slowly, the solution containing perchloride and periodide of mercury. Subiodide of mercury is quickly reddened by nitric acid, half of the mercury being abstracted and forming pernitrate; on cooling, a portion of the periodide formed separates as glittering scarlet scales. Iodide of potassium decomposes it into periodide, which dissolves, and metallic mercury. It is not soluble in a solution of chloride of sodium. Should the preparation be of a yellow color, it contains some quantity of periodide, and this is generally the case when prepared by the moist way, or precipitation. Small quantities of periodide are detected by agitating with alcohol, which dissolves it; filtering and evaporating, when the residue formed is red. Subiodide of mercury consists of two equivalents of mercury, and one of iodine, $Hg_2I = 326$. Iodide of mercury is a powerful irritant poison, but has been administered in small doses in syphilis and scrofula, especially when they occur in the same individual. The dose is one grain per day, cautiously carrying it to three or four grains. Children of six months old require one-sixteenth of a grain, gradually increased to half a grain. It may be given in pill form, conjoined with some narcotic as conium, opium, etc.; or, one part of the iodide may be dissolved in forty-eight parts of ether, of which solution, twelve drops contain about one-fourth of a grain. An ointment, used as a dressing for strumo-syphilitic ulcers, and as an application to sycosis, lupus, rosacea, and other tubercular skin diseases, is made by triturating together six ounces of the subiodide of mercury, with a mixture of white wax two ounces, lard six ounces.—*Lond.*

HYDRARGYRI SUBOXYDUM. *Suboxide of Mercury.*—Also called *Protoxide*, *Gray*, *or Black Oxide of Mercury*, *Hydrargyri Oxydum Nigrum*, *etc.* This ~~salt~~ is prepared by treating *one part* of finely divided Calomel (that prepared by precipitation is to be preferred) in a porcelain mortar, with *one part* of Solution of Caustic Potassa, sp. gr. 1.333, which has previously been diluted with *three parts* of Water; after rubbing together for about half an hour, throw it on a filter, protecting the residue as much as possible from the light, and washed with cold water as long as the fluid passing from it exhibits an alkaline reaction; then dry at the ordinary temperature, and keep in a vessel excluded from the light. An excess of potassa is necessary to insure the entire decomposition of the subchloride of mercury; and heat during the process must be carefully avoided, as it will cause the protoxide to separate into peroxide and mercury. Nevertheless, with every precaution, a small portion will decompose, and during the washing and drying the black color becomes tinged with green. It may likewise be obtained by pouring, drop by drop, into a solution of caustic potassa, one part of pure protonitrate of mercury dissolved in sixteen parts of water, very slightly acidulated with nitric acid; otherwise the protonitrate would be transformed into a nitrate with an excess of acid, and into an insoluble yellow subnitrate. A small excess of alkali is required in this the same as in the preceding process.

Pure suboxide of mercury should be quite black, but from the presence of a little peroxide, it has generally a green tinge; it is very heavy, inodorous, without taste, insoluble in water, alcohol, or alkalies, but readily soluble in dilute nitric acid, and acetic acid. It is readily decomposed by light, becomes olive-colored, and is resolved into peroxide and metal. Rubbed with dilute hydrochloric acid, it becomes converted into a gray powder (a mixture of calomel and metal) while any oxide present remains in solution, and yields with caustic potassa a yellow solution. Heated in a tube it acquires at first a red color, from decomposition into oxide and metal, it then becomes darker, separating into oxygen and metal, and volatilizes without leaving a residue. Its purity may be determined by this last experiment. If on agitating it in water, the latter gives with nitrate of silver a white precipitate, chloride of potassium is present. Its solution in dilute hydrochloric acid should give no precipitate with either potassa, or oxalate of ammonia; if any red oxide had been dissolved, the potassa would throw it down as a reddish or yellowish hydrate; if lime be present, the oxalate will give a white precipitate. This salt consists of two equivalents of mercury, and one of oxygen, $Hg_2 O = 208$.

It is one of the least irritating of the mercurial preparations, when pure, and like them, produces constitutional effects, especially when its use is continued for a time. In doses of from one-fourth of a grain to a grain per day, it acts as an alterative; two or three grains repeated every three or four hours will produce salivation. On account of its varying composition, and tendency to operate severely, owing to the presence of peroxide, it is seldom exhibited internally. One part of the suboxide well rubbed up with three or four parts of lard, has been used as a substitute for mercurial ointment.

HYDRARGYRI SUBSULPHAS FLAVUS. *Yellow Subsulphate of Mercury.*—Also known as the *Subpersulphate of Mercury*, *Turpeth Mineral*, *Tribasic Sulphate of the Oxide of Mercury*, *Hydrargyri Oxydum Sulphuricum*, etc. This preparation is obtained by triturating persulphate of mercury with warm water; the yellow powder resulting therefrom is to be well washed with distilled water, and then dried. It forms a heavy, lemon-yellow, inodorous and tasteless, or slightly acrid powder. It is soluble in 2000 parts of cold water, and in 600 parts of boiling water; the solution is colorless.

Its specific gravity is 6.444. Heated in a tube, sulphurous acid is evolved, and globules of mercury sublimed. Boiled with caustic soda or potassa, red precipitate is thrown down, while the solution contains sulphate of potassa, which gives a white precipitate with chloride of barium. It consists of three equivalents of peroxide of mercury, and one of sulphuric acid, $3\,Hg\,O\,SO_3 = 364$. It was once employed as an emetic, in doses of from three to five grains, in cases of swelled testicle, its nauseating and emetic action being supposed to promote absorption; it has also been recommended in cynanche trachealis. In doses of from one-fourth of a grain to one-half of a grain per day, it has been given as an alterative. One grain mixed with five or six grains of some mild powder, has been used as an errhine in ophthalmic affections, chronic catarrh, cerebral difficulties, etc.; it excites sneezing. One part of turpeth mineral triturated with one hundred or one hundred and twenty-five parts of lard, forms an ointment which has been used, in frictions, in cases of herpes, slightly inflammatory tetters. Like other mercurials, this is apt to cause salivation; and in improper doses acts as a poison. It is seldom used at the present day.

HYDRARGYRI SULPHURETUM. *Sulphuret of Mercury.*—Also known as *crystallized* or *red sulphuret of mercury*, *cinnabar*, *vermillion*, *minium*, *bisulphuret of mercury*, etc. This mercurial is found abundantly in nature, but in a state of impurity. It is prepared by artificial means for commercial purposes, thus: Let mercury, much divided by means of a chamois skin, fall into melted sulphur, bruise the melted mixture, and sublime it once or twice with a moderate heat. Wittstein recommends the following process: Place twelve parts of solution of caustic potassa, sp. gr. 1.333, in a cast-iron vessel, and heat to the boiling point, and while constantly stirring add powdered sulphur so long as it is dissolved (about four and a half parts will be sufficient); the dark-yellow solution must be decanted from the excess of sulphur, and sufficient water be added to replace that which has evaporated, and, if necessary, filter. When entirely cooled pour the solution into a very strong bottle, which must be only four-fifths filled, and add eight parts of mercury; then close the bottle well with a cork and bladder, and shake it continually until the whole of the metal is converted into a bright red powder. As the arm would soon become tired by the operation, it is advisable to employ some mechanical power, as a saw-mill, etc., to keep the bottle in constant and powerful motion; in this case the bottle should previously be well packed with sawdust in a box to prevent its breaking. It is advisable not to put more than one or two pounds of solution into one bottle, and where a large quantity is being operated on to employ several bottles; the shaking should continue at least twenty-four hours. When the mercury is transformed into a bright-red color, it is put into a dark place, the supernatant yellow liquid poured off as much as possible, the powder repeatedly washed, by decantation, with pure water, so long as the latter acquires an alkaline reaction, separated from the heavy gray particles with which it is always mixed, by allowing them to subside first, the remainder collected on a filter, and dried with a gentle heat. If the agitation, above referred to, be accompanied by heat, it gives a preparation of an inferior color.

When prepared by the first process given above, cinnabar forms in dark, reddish-brown amorphous masses of different sizes, composed of a great number of crystalline needles, disposed in parallel and contiguous rows, and which furnish a powder of a beautiful scarlet-red color. Prepared by the latter method, a fiery red, soft, heavy powder is obtained, distinguishable from that prepared by sublimation, both by its bright color, and want of any crystalline appearance even when strongly magnified. Cinnabar is odorless, tasteless, insoluble in water, alcohol, cold nitric acid, sp. gr. 1.2, cold hydrochloric acid, dilute sulphuric acid, and acetic acid. Hot nitric acid decomposes it, precipitating a portion of the sulphur, and converting the other portion into sulphuric acid, sulphate and nitrate of peroxide of mercury being formed; fuming nitric acid totally converts it into persulphate of mercury. Exposed to the light it gradually acquires on the surface a gray tint, arising from the separation of the mercury and sulphur, both of which in their free state remain in admixture with the compound. Heated in a test-tube it acquires nearly a black color, and sublimes without fusing, to a shining iron-gray mass, becoming red on trituration; any adulterations in the cinnabar, as red-lead, colcothar, dragon's blood, chalk, or brick-dust, remain behind. If this residue yields on charcoal before the blow-pipe a bead of lead, red lead is present; but if it undergoes no change either brick-dust or colcothar is present. If dragon's blood be present, it will color alcohol in which the cinnabar has been shaken. If the addition of a mineral acid causes effervescence, chalk is present. If cinnabar be boiled with acetic acid, iodide of potassium will give a yellow deposit of iodide of lead, if red lead be present; and sulphureted hydrogen a black precipitate. Cinnabar consists of one equivalent, each, of mercury and sulphur, $HgS = 116$.

Cinnabar was formerly exhibited internally in diseases of the skin, gout, chronic rheumatism, and worms, in doses of from ten to twenty grains, in pills, or incorporated in an electuary. It is at the present day rarely used internally. In syphilitic ulcerations of the air-passages, and in several chronic cutaneous diseases, it has been used as a fumigating agent; about half a drachm being placed upon an iron plate heated to redness, and the vapors which are evolved being inhaled or directed upon the diseased parts. Owing to the irritating nature of the sulphurous vapor, the suboxide of mercury is preferred to cinnabar for fumigation.

HYDRARGYRI SULPHURETUM NIGRUM. *Black Sulphuret of Mercury.* Also known by the names *Amorphous Sulphuret of Mercury*, *Ethiop's Mineral*, *Hydrargyri Sulphuretum cum Sulphure*, etc. It is procured by rubbing together in a porcelain mortar, equal parts of mercury and washed flowers of sulphur (with the occasional addition of a few drops of water to prevent any dust from ascending), until they form a grayish-black powder, and neither mercury nor sulphur is visible with a magnifying glass; the labor is greatly diminished by employing dilute sulphuret of ammonia instead of water. Black sulphuret of mercury is a heavy, somewhat grayish-black, inodorous, tasteless, insoluble, amorphous powder. insoluble in water, hydrochloric acid, and dilute nitric acid, the latter taking up at the most only small traces of uncombined mercury. Heated in a test tube, it first loses sulphur, which deposits on the cool portion of the tube, and partly combines with the oxygen of the air present, to sulphurous acid; then sulphuret of mercury sublimes, and deposits itself as an iron-gray mass, becoming red when rubbed. If there is a residue either the mercury or sulphur was impure, or charcoal may have been added; animal charcoal may also be detected by its not volatilizing by heat, as well as by the presence of phosphate of lime in the residue. Tersulphuret of antimony may be detected by boiling in hydrochloric acid, and adding nitrate of silver, solution of potassa, and water, either of which causes a white precipitate when the antimonial is present; hydrosulphuret of ammonia produces a reddish precipitate. The exact composition of the black sulphuret of mercury is not positively determined. Wittstein gives as its formula, $Hg S+xS$.

Ethiop's mineral was formerly employed as a diaphoretic, alterative and vermifuge; in doses of from five grains to half a drachm, two or three times a day it has been used in scrofulous and skin diseases. It acts very mildly, and as stated by Dr. Duncan may be continued for a considerable length of time, in doses of several drachms, without producing scarcely any sensible effect. It is seldom used, except in the form of ointment as an application to itch, tetter, and some other cutaneous affections.

PILULÆ HYDRARGYRI. *Mercurial Pills. Blue Pills.* These pills are made by triturating together *two parts* of Mercury with *three parts* of confection of Red Roses, until the globules can no longer be seen; then add finely powdered Liquorice-root *one part*, and beat the whole together until incorporated. Three grains of this pill contain one grain of mercury; the mass is usually divided into pills of five grains each. By trituration, mercury is reduced to a finely divided state, and becomes intimately mixed with the confection and liquorice powder. The confection of roses is preferred in the preparation of this mass to any other article that has been used; yet if sulphuric acid has been added to the confection, as is sometimes done to brighten its color, a very energetic subsulphate of mercury will be formed. The mercury is most easily known to be completely extinguished, if no globules appear, on rubbing a very little of the mass with the point of the finger on a piece of paper, and it may also be examined with a magnifying lens. These pills, or rather the mass in bulk is prepared by machinery; for some practical remarks thereon see *Am. Jour. Pharm.*, *XXIV.*, 204 and *XVII.*, 151, 309. Blue pill is used as an alterative, sialagogue, and purgative, and is said to be less irritating than the other mercurials. It has been used in constipation, biliary derangement, syphilitic diseases, and wherever it is desirable to bring the system under the influence of mercury. As an alterative two or three grains may be given daily, or on alternate days, bed-time being usually preferred for their administration. As a purgative and cholagogue, the dose is from one to three pills, to be taken on going to bed; when thus given, it is customary to administer a dose of castor oil, infusion of senna, or other cathartic on the next morning, as recommended by Abernethy. To cause salivation, from three to five grains taken in the morning, and twice this quantity at bed-time, in conjunction with opium to prevent purging, is usually prescribed. Blue pill is frequently associated with other purgatives, as rhubarb, aloes, jalap, colocynth, etc., also with quinia, antimony, or other agents, according to the indications to be fulfilled.

UNGUENTUM HYDRARGYRI. *Ointment of Mercury.* Triturate in a marble mortar, Mercury *one pound* with Mutton Suet *half an ounce*, and a small quantity of Lard, until the globules entirely disappear, and can not be seen by a magnifying lens having a power of five or six diameters; then add of Lard a sufficient amount to make with that which has already been used *eleven ounces and a half*, and mix thoroughly together. To promote the extinction of the mercury, the addition of ether has been recommended.—(*Am. Jour. Pharm.*, *XVII.*, 80). Various other means have been proposed to facilitate the process, which it is unnecessary to name here; and, indeed, it is doubtful whether any of them are better than the one named above, which will require a considerable length of time to perfect. It is not necessary to triturate continually; half an hour, or an hour at a time, and repeated often, until the extinction of the mercury is effected, will be found to answer. The ointment is of a bluish-gray color, of sp. gr.

varying from 1.72 to 1.78, and requires a powerful microscope to render the mercurial globules visible, which, according to Ehrenberg are from one five-hundredth to one one-thousandth of a line in diameter. The purity of the ointment may be ascertained by its leaving no traces of globules when rubbed on paper; by imparting a silver color to gold upon which it has been rubbed, and which color is removed by heat; by its color; its appearance under a lens having a power of five or six diameters, as well as under a microscope of 300 or 350 diameters; its specific gravity; and by the weight of the mercury remaining after the fatty matter has been dissolved in ether or spirits of turpentine.

Mercurial ointment to be of any service must be applied by gentle friction, continued for some time, at each application, in order to promote its absorption. When it is intended to produce the constitutional effects of the mercury, as in syphilitic diseases those parts of the body are selected in which the cuticle is thinnest, as the inside of the thighs and legs, and under the arms. In liver complaints the inunctions are made over the region of that organ. And in buboes, swellings of the glands, etc., it is usually applied immediately over the affected parts. About half a drachm or a drachm, rubbed in night and morning, will be sufficient, and the person who applies the ointment should protect his hands by enveloping them in some article through which the ointment will not pass, as a soft, oiled, pig's bladder, turned inside out, india-rubber gloves, etc. Or, a strip of muslin two or three inches wide may be formed into a roll about an inch in diameter, one extremity of which may be used to rub over the skin, as a substitute for the hand. During the whole course of the inunction, the patient should wear the same drawers night and day. The ointment is sometimes used internally, in addition to its external application, and is said to promptly excite salivation. It is often used in a milder form as a dressing to ulcers, and in cutaneous diseases; being, in such instances, diluted with two, three, or four times its weight of lard, as may be desired.

UNGUENTUM HYDRARGYRI NITRATIS. *Ointment of Nitrate of Mercury. Mercurial Balsam*, *Yellow* or *Citrine Ointment.* This ointment is prepared by dissolving *one ounce* of Mercury aided by a gentle heat, in a mixture of pure Nitric Acid *one fluidounce* with Distilled Water *half a fluidounce;* when the mercury is dissolved, add to it while hot, a melted mixture of prepared Lard *two ounces*, and fresh Neat's-Foot Oil *ten fluidounces.* Increase the temperature of the mixture until effervescence is produced, then remove from the heat, and with a porcelain spoon or wooden spatula, stir constantly till cool. As it is necessary to have a slight excess of acid in this mixture, in order to prevent the fats from absorbing oxygen from the mercurial oxide, too great a heat must not be employed, as it not only drives off acid vapors but also reduces the mercury to the metallic state. A glass or porcelain vessel should be used in making the ointment; and it should be kept in glass or earthenware vessels, excluded from the light. When well prepared, this ointment has a fine golden-yellow color, the consistence of butter, and a peculiar nitrous odor. It is very apt to become gray when mixed with other ointments, in consequence of their deoxidizing powers; and to prevent this an additional quantity of nitric acid should be added. The ointment should be spread with wooden or ivory spatulas. When the citrine ointment gets too hard, crumbling to powder, it should be softened by triturating with lard or oil; for if melted with them, it very soon hardens again.

This ointment has been used in herpes, porrigo, and similar obstinate cutaneous affections, in ophthalmia tarsi, and those slight excoriations of the tarsi, attended with extreme itching, and in all the inflammations of the eyes attended by eruptive disorders of the hairy scalp or face; it may be applied to the lids by means of a camel's-hair pencil. It is also used as a dressing to stimulate syphilitic, phagedenic, and obstinate ulcers. In ophthalmic affections it is frequently applied, mixed with an equal weight of almond oil. A *milder ointment* of nitrate of mercury is made by rubbing together one part of ointment of nitrate of mercury with seven parts of lard; it should be prepared only as required.

NICKEL is rather a scarce mineral, and generally occurs in combination with some other metals, from which it is difficult to separate it, and for which several processes have been advised. When pure, nickel is white, resembling silver, is softer than iron, has the specific gravity 8.27 to 8.93, is malleable, attracted by the magnet, is not altered by the action of the air or of water, is soon tarnished when moderately heated, and forms an oxide. Its preparations are said to be poisonous. The sulphate has been recommended. Nickel has the formula Ni, and equivalent weight 29.5.

*NICCOLI SULPHAS. *Sulphate of Nickel.*—According to Thomson, this salt is easily formed by dissolving carbonate of nickel in dilute sulphuric acid, and concentrating the solution. When the solution contains an excess of acid the crystals are rectangular prisms with square bases. When it is neutral, the crystals are usually right-rhombic prisms, very nearly the same form as sulphate of zinc. The color of the salt is a fine deep emerald-green, its taste is styptic, slightly acrid, and persistent. At 60° F., 100 parts of water dissolve 75.6 parts of these crystals. Neither alcohol nor ether dissolves them. Exposed to the air the rhombic prisms lose a little water, but not the square prisms. When heated they swell up, but do not melt, and they become yellow when the water is driven off. Their formula is $\mathrm{Ni\ O{+}SO_3{=}77.5}$. Sulphate of nickel has been recommended by Prof. Simpson, of Edinburgh, as a tonic, in doses of from half a grain to a grain, repeated every four or five hours, and given in pill form. He has found it quite efficient in periodical cephalalgia. *Braithwaite's Retrospect*, *XXVII.*, 446.

PLATINUM.—This metal is found in several parts of the globe, occurring in grains or in small plates, and often in combination with other metals. It requires to pass through certain processes in order to render it fit for practical purposes. It is white, somewhat darker than silver, and not so bright, is odorless, tasteless, ductile, malleable, unalterable in air or water, oxidizing with difficulty, and of specific gravity from 21.47 to 21.54. The strongest artificial heat will not melt it. It has been drawn into wires $\frac{1}{1940}$th of an inch in diameter. Its formula is Pt, and its equivalent weight 99. Two salts of this metal have been used in medicine.

Platinum black is prepared from the chloride of platinum. It is a black powder, insoluble in nitric acid, hydrochloric acid, or water, but readily dissolves in nitro-hydrochloric acid. Its most peculiar property is that of oxidizing alcohol, forming acetic acid. Placed under a bell-glass with a small dish filled with alcohol, the latter after about a quarter of an hour acquires a powerful acid reaction, and has a strong smell of acetic acid. Platinum black condenses in its extremely fine pores a considerable quantity of oxygen, and as this is transferred to the alcohol, the platinum black again condenses a fresh portion, keeping up a constant supply; the alcohol forms acetic acid and water.

PLATINI BICHLORIDUM. *Bichloride of Platinum. Nitromuriate of Pla-*

tinum.—This salt is prepared by dissolving platinum in nitro-hydrochloric acid, and evaporating the solution cautiously to drive off all excess of acid. A dark reddish-brown, deliquescent, saline mass is obtained, which is soluble in water, alcohol, or ether. Its formula is $Pt\,Cl_2=170$. Bichloride of platinum is a powerful caustic poison. In small doses it has been recommended in secondary syphilis, in doses of an eighth or a fourth of a grain, three or four times a day. It may be administered in aqueous solution, or in pill form. An ointment, composed of five grains of the bichloride, ten grains of extract of belladonna, and one hundred and sixty grains of lard, has been applied to indolent and syphilitic ulcers.—*Hœfer.*

SODII PLATINO-BICHLORIDUM. *Platino-Bichloride of Sodium. Chloroplatinate of Sodium. Muriate of Platinum and Soda.*—This salt may be procured by dissolving 170 *parts* of pure Bichloride of Platinum, and 58.5 of pure Chloride of Sodium, in separate portions of Distilled Water. Mix the solutions, and cautiously evaporate to crystallize. The crystals are red, soluble in water or alcohol, and have the formula $Na\,Cl\,Pt\,Cl_2+6\,HO$. When heated they lose their water of crystallization, and become anhydrous, forming a yellow powder $Na\,Cl\,Pt\,Cl_2=228.5$. This is recommended in syphilitic and scrofulous diseases, in doses of an eighth of a grain to half a grain, three times a day, in powder with starch, pill, or a mucilaginous solution. It is milder in its action than the bichloride of platinum. Half a drachm of the soda salt of platinum dissolved in half a pint of decoction of poppies, has been used as an injection in gonorrhea; or, two grains to an ounce of oil or fat has also been used.

PLUMBUM. *Lead.*—This is a well known metal, and is met with in great abundance, in combination with sulphur, oxygen, arsenic. Its most common ore is the sulphuret of lead, termed *galena*, $Pb\,S$, from which it is extracted by roasting the sulphuret in a reverberatory furnace, which drives off the greater part of the sulphur in the form of sulphurous acid; it is then smelted with coal and lime, the lead collected, and cast into large ingots, called "pigs." Lead is of a bluish-white color, and when newly melted is very bright, but soon tarnishes under exposure to the air. It is almost tasteless, and emits a peculiar odor on friction. It is one of the softest of the metals, is malleable but not ductile, and has the specific gravity 11.35. It fuses at 612° F., and at a very strong heat boils and evaporates. The fused metal crystallizes on cooling slowly. Pure distilled water does not oxidize lead, but when it is acted upon by water conjointly with atmospheric air, or carbonic acid, a thin crust of basic carbonate is soon formed. Lead may be detected in solution by sulphureted hydrogen, which throws down a black precipitate; ferrocyanuret of potassium, which gives a white precipitate, and iodide of potassium, which causes a yellow precipitate. Its formula is $Pb=104$. Lead is a poison, and when taken internally it is absorbed, and may be detected in the fluids and solids. When the system is impregnated with lead, it is said to produce a leaden discoloration of the gums, teeth, and mucous membrane of the mouth, a peculiar lead taste and odor, jaundice, emaciation, and a feeble, irregular state of the circulation, the pulse being often reduced to 40 or 45 beats per minute. In large doses, or when continued for some time in small doses, lead gives rise to certain abdominal pains, termed *lead colic;* sharp pains in the limbs, unaccompanied by either redness or swelling, and which are increased by motion, and diminished by pressure, and are frequently accompanied by hardness, and cramps in the affected parts, and which condition is termed *lead arthralgia; lead* *paralysis*, which attacks the extremities, more commonly the superior, and which appears to affect the extensor muscles principally, the hands being bent, and the arms dangling by the side. There may also be a paralysis of sensation. The brain may also become affected with what is termed *lead encephalopathy*, manifested by furious or tranquil delirium, more or less profound coma, or convulsions. In cases of chronic poisoning by lead, the antidotal treatment is, to place the patient in a bath made by dissolving sulphuret of potassium four ounces in thirty gallons of warm water, which converts the lead on the surface to a black sulphuret, which must be removed by means of soap and water, and a good stiff brush, and which should be repeated every few days until the skin no longer becomes discolored by the sulphureted bath. Internally, water acidulated with sulphuric acid should be drank; or solutions of the sulphates of soda, or magnesia, or alum. A decoction of ground ivy (*nepeta glechoma*) may be drank freely; or, water acidulated with the juice of preserved barberries. Iodide of potassium has been recommended, and is said to render the lead with which it comes in contact more soluble, so that it can be more readily passed from the system. The bowels must be kept regular by castor oil, to which croton oil may be added if necessary; opiates may be given to relieve pains and cramps; tonics to improve the strength when there is much debility; and nux vomica or strychnia, with electro-magnetism and frictions or shampooning, to overcome the paralysis.

Medicinally, the preparations of lead are rarely used internally, except as sedatives and astringents in hemorrhages and dysenteries. The acetate is more generally employed. Their internal use is very apt to produce constipation, loss of appetite, indigestion, griping pains, etc. They are more commonly used as topical applications in superficial inflammations, contusions, fractures, excoriations, etc., and some forms of cutaneous disease.

PLUMBI OXYDUM. *Oxide of Lead. Semivitrified Oxide of Lead.*—When lead is heated in the air so as to be converted into vapor, it burns with a white light, and forms oxide of lead, which, when thus obtained, is termed *Flowers of Lead.* If melted lead be exposed to a current of air, it is rapidly oxidated and converted into the protoxide of this metal; the oxidated skimmings are called *Massicot.* These, when fused at a bright red heat, are separated from some intermixed metallic lead; the fused oxide forms, on solidifying, a brick-red mass, which readily separates into crystalline scales, termed *Litharge.*

Oxide of lead is generally in crystalline scales, which are shining, opaque, canary yellow or reddish, inodorous and tasteless. Its color may be white, yellowish, or reddish, according to its mode of preparation. There are several forms of it—one, termed *Massicot*, which is yellow; another, semivitrified, termed *litharge;* another, in small scales of a yellowish or reddish color, called *Gold* or *Silver Litharge.* Oxide of lead is fusible, volatile at a very high temperature, slightly soluble in water, and forms salts called *Plumbites* with alkalies and earths. Exposed for some time to the air it slightly attracts carbonic acid. On heating, it acquires a reddish color, becoming yellow again on cooling. At a strong red heat it fuses to a yellow transparent liquid, and forming, when cold, a yellowish red, heavy, opaque mass, consisting of crystalline scales (litharge). By simply fusing oxide of lead, it is never obtained in a transparent state on cooling; this only occurs when it contains silica. Litharge is not half fused, as generally stated, but thoroughly fused oxide of lead, as a glance at its formation, by volatilizing lead from its alloys with silver or gold readily proves. Nitric and acetic acids dissolve oxide of lead, forming a colorless solution; if the solution is accompanied with effervescence, *Carbonic Acid*, or a *Carbonate*, is present; and a blue tint to the solution denotes *Copper*. Traces of copper are detected on adding ferrocyanuret of potassium to the solution from which nitrate of lead has been decomposed by sulphate of soda, if a chocolate-colored precipitate forms, it is present; any iron present should, previous to the addition of the ferrocyanuret, be removed by ammonia. *Iron* is detected by the red color which sulphocyanuret of potassium forms with the nitrate, a solution of sulphocyanuret of iron being formed. If nitric acid leaves a portion of oxide of lead undissolved, and of a dark brown color, it is *Peroxide*, and in this case the color of the oxide is a reddish-yellow, instead of a clear yellow. A reddish-yellow appearance may also be the result of heating too strongly, that is, of incipient infusion, without any peroxide being present. A white residue, on treating with nitric acid, may be due to *Oxide of Antimony*, in commercial litharge; this residue gives a metallic bead when heated on charcoal and white fumes, with which the latter becomes covered. *Silica* also remains undissolved, but is unchanged when heated on charcoal. Oxide of lead consists of one equivalent, each, of lead and oxygen, $PbO=112$. It is sometimes employed, sprinkled on ulcers, etc., as an astringent and desiccative. It enters into the composition of several plasters and ointments. When boiled with cream of lime, it forms a plumbite of lime, which has been employed as a hair-dye.

PLUMBI CARBONAS. *Carbonate of Lead.* Also termed *Cerusse*, *White Lead*, *Flake White*, *Magistery of Lead*, etc.—This is found in nature in small quantities, and is prepared artificially by causing a current of carbonic acid gas to pass through a certain quantity of solution of subacetate of lead. It is also prepared by several other processes. Carbonate of lead is in very white conic pieces or fine powder, inodorous, insipid, and of sp. gr. 6.07. Water does not dissolve it unless by the aid of carbonic acid. Diluted nitric acid dissolves it with effervescence. Heated on charcoal by the blowpipe, it yields globules of metallic lead, usually surrounded by a small quantity of the yellow oxide. It is blackened by sulphureted hydrogen, and the hydrosulphurets. It is sometimes adulterated with sulphates of lead, lime, or baryta, which may be detected by their insolubility in diluted nitric acid. If the carbonate be dissolved in diluted nitric acid, the addition of sulphureted hydrogen will precipitate the lead; then boil and filter the solution, and if chalk be present, oxalate of ammonia will cause a white precipitate. When carbonate of lead is pure, it does not lose weight at 212° F.; 68 grains are entirely dissolved in 150 minims of acetic acid diluted with a fluidounce of distilled water; and the solution is not entirely precipitated by a solution of 60 grains of phosphate of soda. The neutral or monocarbonate consists of one equivalent, each, of carbonic acid and oxide of lead. $PbO\ CO_2=134$. The subcarbonates vary in their composition. The white lead of commerce contains hydrated oxide of lead in greater or less proportion. Carbonate of lead is never used internally. It has been applied externally as an astringent and desiccative to excoriated surfaces, burns, scalds, etc.; it may be dusted over the parts; applied in the form of ointment, one part to eight of simple cerate; or, as a lotion, one part to three parts or more of linseed oil. Its absorption is said to be attended with considerable danger.

*PLUMBI CHLORIDUM. *Chloride of Lead. Horn Lead.*—This preparation may be obtained by dissolving *four parts* of Acetate of Lead in *twelve parts* of Distilled Water and then adding pure Hydrochloric Acid, sp. gr. 1.130, as long as a precipitate is caused (about three parts). Throw the precipitate on a filter, wash it a few times with distilled water, and dry it with a gentle heat; the yield will be about $2\frac{2}{3}$ parts. It is a white crystalline powder, consisting of fine needles, odorless, of a sweetish astringent taste, and permanent in the air. Heated it fuses, forming when cold a horny semi-transparent mass (*plumbum corneum*), which at a higher temperature is completely volatile without decomposition. Water at 60° F., dissolves one-thirtieth, and at 212° F., one-twentieth of this salt; the solution has an acid reaction. Alcohol does not dissolve it. If it contains *copper* it acquires a greenish tint on becoming moist in the air; and ammonia causes a deep blue solution. Its aqueous solution causes a white precipitate with nitrate of silver, soluble in ammonia, but insoluble in nitric acid. It consists of one equivalent, each of lead and chlorine, $Pb\,Cl = 139.5$. Chloride of lead is employed externally, as an astringent and caustic application. It combines with fibrin and albumen forming insoluble compounds; and when absorbed into the system it produces the usual effects of the compounds of lead. When applied to cancerous ulcerations, and in painful neuralgic affections, it is said to allay pain and restrain morbid action, and also to allay inflammation. It may be used in the form of lotion, one drachm of the chloride dissolved in a pint of water; or, as an ointment, one part of the chloride to eight parts of lard.

*PLUMBI IODIDUM. *Iodide of Lead.*—Prepared by dissolving *one part* of Nitrate of Lead in *twenty parts* of Distilled Water, and then mixed with a solution of *one part* of Iodide of Potassium in *eight parts of* Water; allow the precipitate to subside, throw it on a filter, wash it well with cold water, and dry with a gentle heat. The product will be one and two-fifth parts. Acetate of lead can not be substituted for the nitrate, as the acetate of potassa that results is a solvent of iodide of lead. Iodide of lead is an odorless, fine yellow powder, without taste, soluble in 1,990 parts of cold, and 1,330 parts of boiling water; the solutions are colorless, the hot one depositing as it cools large brilliant golden scales; 4,500 parts of cold alcohol, 80 per cent., and rather less of hot alcohol, dissolve one part of iodide of lead, forming pale straw-colored solutions; the hot one depositing on cooling excessively fine glistening scales. Ether acts on it like alcohol. When heated it becomes reddish yellow, then darker, and finally fuses to a dark brown liquid which give off iodine, and on cooling forms a lemon-yellow basic compound. It combines with the alkaline iodides, forming iodo-plumbates. Iodide of lead should be kept excluded from light. It is composed of one equivalent, each, of lead and iodine, $Pb\,I = 230$. It has been used both internally and externally in the discussing of scrofulous and syphilitic tumors, indolent ulcers, periostitis, etc. The dose internally is half a grain, cautiously increased to three or four grains, in pill form with confection of roses. Externally, an ointment may be used, composed of one part iodide of lead, and eight parts of lard; to be applied to the tumors by friction. It is liable to produce the ordinary effects of the lead preparations, in consequence of which, as an external application, iodide of cadmium has been preferred.

PLUMBI NITRAS. *Nitrate of Lead.*—This saturnine salt may be obtained by dissolving Litharge, in fine powder, *four ounces and a half*, in dilute Nitric Acid *one pint*, by the aid of a sand-bath. Filter, and set the liquor aside to crystallize; concentrate the residual liquid to obtain more crystals. Dry the crystals on bibulous paper, in a warm atmosphere, and preserve in a well closed bottle. The crystals are white, pearly, opaque, their shape being usually the regular octahedron, sometimes the cube, cubo-octahedron, and the tetrahedron, or various modifications of these forms. If the liquor from which they crystallize, instead of being neutral, contains an excess of acid, the crystals are transparent and colorless. They have a sweet, austere taste, are unalterable in the air, soluble in alcohol, and in 7.6 parts of boiling water, and have the sp. gr. 4.068. When heated they decrepitate loudly, emitting brilliant sparks. Triturated with sulphur in a hot mortar, a feeble detonation is produced, and the lead is reduced to the metallic state. Iron occasions no precipitate though kept in the solution of nitrate of lead. It is composed of one equivalent, each, of nitric acid and oxide of lead, $Pb\,O\,NO_5 = 166$. Nitrate of lead forms a precipitate with fibrin and albumen, and decomposes the sulphates, chlorides, and hydrosulphurets contained in animal fluids. It produces the general effects of the soluble salts of lead upon the system. It is rarely used internally, though recommended many years since in asthma, epilepsy, and to check hemorrhages, in doses of from one-fourth of a grain to a grain, in pill or solution. Externally, a solution has been employed as a topical application to wounds, ulcers, sore nipples, cancerous diseases, chapped hands, cutaneous affections, and phagedenic ulcers; also as an injection in offensive discharges from the vagina, urethra, etc. When applied to sore nipples, these should always be washed with warm water each time before the child is put to the breast. From ten grains to a drachm of the nitrate dissolved in a fluidounce of distilled water, according to the strength desired has been used. Nitrate of lead is likewise used as a disinfectant; it completely destroys the unpleasant odor of animal and vegetable substances which are evolving sulphureted hydrogen, or hydrosulphuret of ammonia. *Ledoyen's disinfecting fluid* is a solution of eight drachms of nitrate of lead in half a pint of distilled water.

* PLUMBI SACCHARAS. *Saccharate of Lead.*—This salt is best obtained by saturating an aqueous solution of saccharic acid with freshly precipitated and moist carbonate of lead, added in small successive portions; the first generally dissolve, but afterward the saccharate falls in proportion as saturation ensues, in the form of a white powder, very sparingly soluble in boiling water. Its formula is $Pb\,O\,\overline{Sac} = 208$. Saccharic acid, formed by the action of nitric acid on sugar, exerts no greater action on phosphatic concretions than malic acid; and saccharate of lead is inert; but the acid saccharate of lead is an active decomponent of phosphatic calculi, though mild in its action on the living tissues. A *nitrosaccharate of lead* has been proposed by Dr. Hoskins, as a solvent for phosphatic calculi. It is prepared by dissolving a portion of powdered saccharate of lead in a sufficient quantity of nitric acid diluted with nineteen parts of water; filter the solution, evaporate, and set aside to crystallize. Amber-colored crystals in the form of regular hexagonal plates or prisms were obtained. A solution of this, formed by moistening one grain of the nitro-saccharate with five drops of pure saccharic acid, and dissolving in a fluidounce of distilled water, used as an injection into the bladder, was found to act rapidly on phosphatic calculi, without any irritating or injurious effects, even when injected daily, and retained, each time, in the bladder for half an hour.

* PLUMBI TANNAS. *Tannate of Lead.*—This salt may be procured by adding a solution of tannic acid to a solution of acetate of lead, until a precipitate is no longer formed; collect the precipitate on a filter, wash and dry it. This has been recommended as an application to excoriations, sloughing bed sores, chronic ulcers of the feet, etc. It may be dusted on

the parts; applied in the form of liniment, composed of three ounces of the salt moistened with two fluidrachms of alcohol, and applied while moist; or, used in ointment, two parts of the tannate to five parts of lard.

STANNUM. *Tin.*—This metal is found in nature in the state of an oxide, or of a sulphuret. The former is a peroxide, termed *tin stone*, and *wood tin*, $Sn\,O_2$; the latter is called *tin pyrites*, $2\,Fe\,S\,Sn\,S_2 + 2\,Cu_2\,S\,Sn\,S_2$, and is a rare mineral. When the oxide is found in loose grains, it is called *stream tin*, from which *grain tin* is obtained by smelting the oxide with charcoal or culm in a reverberatory furnace. Another variety of the oxide, *mine tin*, when stamped, washed, roasted, and smelted with culm and limestone, yields *block tin*. There are other kinds, as, *Malacca tin* in quadrangular pyramids with flattened bases, and *Banca tin* in wedge-shaped pieces. Pure tin has a fine white, silver-like color, very brilliant when fresh, a slightly disagreeable taste, and emits a peculiar odor when rubbed. It is very malleable, and may be beaten into leaves $\frac{1}{2000}$ of an inch thick, is flexible, producing a crackling noise upon being bent, is sparingly ductile, melts at 442° F., is volatilized at a white heat, and has a sp. gr. varying from 7.178 to 7.299. Exposed to the air it soon loses its luster, and becomes grayish-black. It is almost wholly soluble in hydrochloric acid, forming a colorless solution, which forms a dark purplish precipitate, called the *purple of Cassius*, when chloride of gold is added to it; and a white precipitate when liquor potassa is added to it, which is soluble in an excess of the precipitant. Its formula is $Sn = 59$. Tin is much used in the arts for various purposes. In medicine, it has been used as a vermifuge, in two or three forms. It is not considered to be poisonous, though fats, acids, etc., which have remained for some time in tin vessels, are said to have caused colic and vomiting. The following are the preparations which have been used:

STANNI PULVIS. *Powder of Tin. Granulated Tin.*—"Melt tin in an iron vessel; pour it into an earthenware mortar heated a little above the melting point of the metal; triturate briskly as the metals cools, ceasing as soon as a considerable portion is pulverized; sift the product, and repeat the process with what remains in the sieve."—*Ed.* Pereira states that melted tin shaken in a wooden box, the inside of which has been rubbed with chalk, may be thus reduced to powder. The powder thus procured, has been administered for the expulsion of tape-worm and the lumbricoides, and has also proved beneficial in epilepsy produced by worms. The dose is half an ounce, in syrup or molasses, repeated every morning before breakfast, and, after it has thus been taken for several days in succession, an active purgative should be given. Tin filings (*stanni limatura*) have also been used. Powder of tin should not be administered when it becomes oxidized.

STANNI BISULPHURETUM. *Bisulphuret of Tin.*—Also known by the names of *Aurum Musivum*, or *Mosaic Gold.* It is obtained by placing a mixture of *twelve parts* Tin, *seven parts* Sulphur, *three parts* Mercury, and *three parts* Sal Ammoniac in a black lead crucible, to the top of which an aludel is luted, and exposing the whole to a strong heat for eight hours. The Mosaic gold sublimes. The mercury facilitates the fusion of the tin and its combination with sulphur; the sal ammoniac keeps down the temperature, and thereby prevents the conversion of the bisulphuret into protosulphuret of tin. According to Pelletier it may also be prepared by heating together in a retort, a mixture of equal parts of sulphur and oxide of tin. It is in the form of light, golden-yellow scales, which are insoluble in water or alcohol, soluble in hot liquor potassa forming a green solution, soluble and decomposed when boiled in nitro-hydrochloric acid, but is not acted upon either by nitric or muriatic acids. Its sp. gr. is from 4.4 to 4.6, and its formula $Sn\ S_2 = 91$. It forms a *bronze powder* much used in the arts, especially by the manufacturers of paper-hangings. In medicine, ten to twenty grains of the bisulphuret, as a dose, mixed with honey, and repeated two or three times a day, have been used to remove tape-worm.—*P.*

STANNI CHLORIDUM. *Chloride of Tin.*—Also known as *Protochloride of Tin*, *Salt of Tin*, etc.—It may be procured by dissolving Granulated Tin, *one part*, in boiling Hydrochloric Acid, sp. gr. 1.130, *four parts*, until no more action is perceptible on the metal, then evaporating the solution so that it may crystallize. The crystals (the hydrated chloride of tin $Sn\ Cl\ HO$) are neutral, colorless, and transparent; by the aid of water they are decomposed into the hydrochlorate of the chloride, which remains in solution, and a white pulverulent oxichloride which precipitates; an excess of hydrochloric acid prevents this decomposition. The chemical characteristics are named under tin. If *arsenic* or *antimony* are present in tin or its salts, they may be detected by Marsh's apparatus. They will mostly be given off during the solution of the metal, by hydrochloric acid, as arseniureted, and antimoniureted hydrogen; any portion which is not thus volatilized will form a blackish deposit in the liquid, and when washed, dried, and heated on charcoal before the blowpipe, arsenic will be detected by the garlic odor, and antimony by the white deposit and metallic globules on the charcoal support. *Sulphur*, another frequent impurity in tin, is also evolved in combination with hydrogen. *Copper*, when pure, is insoluble in hydrochloric acid, but dissolves when oxidized by the action of air, and being taken up by excess of ammonia, in precipitating the protoxide of tin, imparts to the supernatant liquor a blue color. *Iron* is discovered by the deep red color with sulphocyanuret of potassium, if the tin solution has been treated with aqua regia to convert the iron into chloride. If *lead* is present, and not in very small quantities, it crystallizes as chloride, in needles, from the tin solution; a smaller quantity is detected by a solution of sulphate of soda, which causes an almost insoluble precipitate of sulphate of lead.

Chloride of tin has been used as a vermifuge against tape-worm; as an antispasmodic in epilepsy, chorea, and other spasmodic diseases; as a stimulant to paralyzed muscles in paraplegia; as an antidote in poisoning by corrosive sublimate; and as an external application in chronic cutaneous diseases. Internally, the dose is from one-sixteenth of a grain to half a grain, two or three times a day, in the form of pills, or taken in the spirit of hydrochloric ether. Externally, it possesses astringent, irritant, and caustic properties, and after being absorbed, acts powerfully on the skin, like the antimonials. It has been used in solution, one-sixth of a grain to one grain in a fluidounce of distilled water. As a poison, it causes spasmodic movements of the muscles of the extremities and of the face, and sometimes paralysis; its antidotes are milk, and other albuminous substances.—*P.*

ZINCUM. *Zinc.*—Zinc or spelter occurs in the mineral kingdom in the form of oxide, *red zinc*, of sulphuret, *blende* or *black jack*, of carbonate, *calamine*, of sulphate, *white vitriol*, of silicate, *electric calamine*, and aluminate, *gahnite* or *automalite.* It is more generally prepared from the native sulphuret, or carbonate, by roasting these, to drive off carbonic acid and water from the carbonate, or sulphur from the sulphuret; then heating the resulting oxide with charcoal, to reduce the metal, which is collected in a vessel of water, melted, and cast into ingots. Zinc is of a brilliant white color, with a shade of blue, and is of a lamellated and crystalline texture, having a peculiar taste and a perceptible odor, when rubbed for some time between the fingers. It is rather soft, tinges the fingers of a black color when rubbed upon them, has a sp. gr. from 6.8 to 7.2, is tough, from 212° to 300° is ductile and malleable, and at 400° is so brittle that it may be reduced to powder. It fuses at 750° F., and if the heat be increased, it evaporates, and may easily be distilled over in close vessels.

In the air zinc gradually loses its luster, becoming covered with a thin gray coating of oxide, of a similar nature to the scum which forms on fusing; if this last named scum be removed when the metal is at a bright red heat, the latter ignites and burns with a clear, greenish-white flame to oxide. Zinc is readily soluble in dilute nitric and hydrochloric acids; should the former leave a white residue which with carbonate of soda before the blow-pipe is reduced to a ductile metallic bead, *tin* is present; this metal is only oxidized not dissolved by nitric acid. If the same solution acquires a red color with sulphocyanuret of potassium, *iron* is present; a white precipitate with nitrate of baryta is *sulphur* oxidized to sulphuric acid by the nitric acid. A fetid gas evolved on dissolving in hydrochloric acid is due to *carbon;* if the gas passed into acetate of lead causes a blackening, it is due to *sulphur* as sulphureted hydrogen; while a metallic ring (when a pointed tube is fixed to the evolution flask, the gas ignited, and a cold piece of porcelain applied) arises from *arsenic;* a garlic odor given off by zinc when heated before the blowpipe on charcoal is caused by this metal. If sulphureted hydrogen causes in a dilute acid solution of the chloride a yellow precipitate readily dissolved by concentrated hydrochloric acid, it is *cadmium* only; a more or less brown one is *lead* or *copper*. To determine which of these it is, the sulphureted hydrogen precipitate is well washed and dissolved in dilute nitric acid, the sulphur filtered off, water added, and then a solution of sulphate of soda, by which the lead is thrown down as an insoluble sulphate; a trace of sulphate of lead, if this metal is present, is also formed by the action of the nitric acid on the sulphuret of lead; this trace of sulphate remains in solution and only precipitates on the subsequent dilution with water. The liquid filtered from the sulphate of lead is then supersaturated with carbonate of soda, a white precipitate ensuing is carbonate of cadmium, which heated on charcoal before the blowpipe is reduced to a metallic state, then volatilizes and forms a brown deposit on the charcoal. A blue tint in the supernatant liquor denotes copper; it is therefore to be saturated with acetic acid, and a few drops of ferrocyanuret of potassium added, when a chocolate-colored turbidness confirms it. When *manganese* is present in such traces as not to be detected by the ordinary reagents, the best method is to fuse the oxidized metal in a platinum crucible with carbonate of potassa, to which it imparts a bluish tinge from the formation of manganate of potassa.—*Witt.*

Pure zinc is soluble in dilute sulphuric acid, with the evolution of hydrogen gas. Ferrocyanuret of potassium, added to this solution forms a white precipitate, which will have a bluish shade if *iron* be present; if the liquid be neutral, hydrosulphuret of ammonia occasions a white precipitate, which, however, will be more or less colored if iron be present. Commercial zinc is never pure, but contains more or less carbon, iron, lead, cadmium, etc., which may be known by the scanty grayish-black residuum which remains after the zinc has been dissolved in dilute sulphuric acid. The formula of zinc is $Zn=32.5$. Metallic zinc is not used in medicine; several of its salts are, however, some of which have already been described.

ZINCI ACETAS. *Acetate of Zinc.*—This salt may be procured by warming in a flask *two parts* of dry Carbonate of Zinc, and then gradually adding concentrated acetic acid, sp. gr. 1.045, until it is entirely dissolved. Five parts of acid will be requisite. The solution is filtered while warm, and set in a cool place to crystallize. After a day or two, the liquor is poured off, and evaporated to further crystallization. The crystallized salt is spread on bibulous paper, and dried at the ordinary temperature. The yield will be nearly double that of the carbonate of zinc employed. Or, it may be obtained by double decomposition of a solution of 287 grains of crystallized zinc, by a solution of 380 grains of crystallized acetate of lead; insoluble sulphate of lead is precipitated, while the solution contains acetate of zinc, which may be obtained by filtering and crystallizing as in the previous process. About 183 grains of acetate of zinc will be procured. Acetate of zinc crystallizes in white, oblique, rhombic tables, of a considerable size, and silky luster, having a faint acetic odor, and a bitter, saline, nauseous taste. It is slightly efflorescent, soluble in three parts of water at 60° F.; in half a part of water at 212° F.; in thirty parts of alcohol 80 pr. ct., at the ordinary temperature; and in one part when boiling. The solutions have an acid reaction. When heated it fuses, loses water of crystallization, then blackens, giving off empyreumatic products; the zinc becomes reduced, but from access of the air bursts into a bluish-white flame, and burns to oxide. Sulphuric acid decomposes it, evolving the vapor of acetic acid. Its formula is $Zn\,O\,C_4\,H_3\,O_3=91.5$.

As an internal medicine acetate of zinc in doses of one or two grains gradually increased is said to be tonic and antispasmodic, and has been used in the same cases in which the oxide or sulphate of zinc is employed. In large doses it causes vomiting and purging. It is principally used in solution as an astringent application in chronic ophthalmia, leucorrhea, gleet, and chronic gonorrhea. Two or more grains of the acetate may be dissolved in a fluidounce of pure water, and used as a wash, or by injection.

ZINCI CYANURETUM. *Cyanuret of Zinc.*—To a solution of *one part* of Sulphate of Zinc in *ten parts* of Distilled Water, add Solution of Cyanuret of Potassium in small quantities at a time so long as any precipitate occurs; filter, wash the precipitate, and dry it. It forms a white powder, insoluble in water or alcohol, consisting of one equivalent, each, of zinc and cyanogen, $Zn\,Cy=58.5$. If a strong mineral acid be added to it, it is decomposed, hydrocyanic acid being developed, and a soluble salt of zinc obtained. This salt has been proposed in Germany, as a substitute for prussic acid. Dr. Henning who has used it with much success, asserts that it is not only of service in those cases in which hydrocyanic acid is commonly exhibited, but also in verminous diseases of children. He gave it in one-grain doses mixed with pulverized jalap; and in the nervous affection called *cramp of the stomach*, he administered an *anti-gastralgic powder* composed of cyanuret of zinc three grains, calcined magnesia twenty-four grains, powdered cinnamon twelve grains; mix, and divide into twelve powders, of which the patient takes one every four hours. This salt has also been recommended in St. Vitus' dance, epilepsy, and other nervous and spasmodic diseases. The dose is one-eighth of a grain, three times a day, in pill or powder, cautiously increased to a grain.

ZINCI FERROCYANURETUM. *Ferrocyanuret of Zinc.*—Dissolve ferrocyanuret of potassium thirty parts in boiling water and gradually add to it a solution of sulphate of zinc forty parts in boiling water—add these solutions together while hot, and continue dropping in the last named solution as long as it causes a precipitate ; filter, wash the precipitate and dry it. It forms a white powder. Its action is similar to that of the cyanuret of zinc, and it is used in the same diseases, in doses of one grain, gradually increased to three or four grains. It may be given in powder with magnesia and cinnamon ; in pill form ; or in solution with water.

ZINCI IODIDUM. *Iodide of Zinc.*—This salt may be made by placing *two parts* of Iodine, and *one part* of powdered Zinc in water, heating the whole until the solution is colorless, evaporating to dryness, and if crystals are desired, fusing the residuum, which forms beautiful prismatic crystals of anhydrous iodide of zinc on cooling. Iodide of zinc is generally used in the non-crystalline form, it is soluble in water, deliquescent, and has a disagreeable, austere, metallic taste. When heated in the open air, it is decomposed, the acid is driven off, and oxide of zinc remains. Iodide of zinc may also be obtained by placing two parts of zinc and seventeen parts of iodine in a matrass or flask, and heating until they sublime; in this way it is formed in white acicular crystals.

Internally, iodide of zinc has been used as a tonic in spasmodic affections occurring in patients of a strumous diathesis. It is usually administered in syrup, which preserves it from the action of the air. The syrup may be prepared in the same manner as the iodide of iron. Dr. A. T. Thomson recommends iodine four drachms, powdered zinc two drachms, to be agitated in four fluidounces of distilled water, until the solution is colorless; then filter, and add twelve fluidounces of syrup. The dose of this is from ten to forty drops three times a day, in water. Mr. A. B. Taylor recommends another formula for preparing this medicinal syrup, in the *Am. Jour. Pharm.* 1852, p. 33. Externally, an ointment (one part of the iodide to eight parts of lard) has been recommended as an application to tumors, by friction ; a grain or two dissolved in a fluidounce of water has been used with benefit in gonorrhea—injecting a teaspoonful or two into the urethra two or three times a day. Twenty or thirty grains dissolved in a fluidounce of water, has been found useful in enlargement of the tonsils; it must be applied by means of a small probang, or camel's-hair pencil, and after several days the deliquescent iodine should be used instead, applying it by means of a camel's-hair pencil.—*J. J. Ross.*

ZINCI VALERIANAS. *Valerianate of Zinc.*—*One part* of pure Valerianic Acid (the terhydrate) is dissolved in a flask with *ninety parts* of Water, *half a part* of Carbonate of Zinc freshly precipitated and in a moist state added, digested at a moderate temperature for some hours in a sand-bath, then allowed to cool, filtered, and evaporated to half. The salt which separates is strained from the liquor while warm, and the latter evaporated lower. Dry the anhydrous salt at a gentle heat; it will weigh about one part.

The hydrated salt is obtained when freshly precipitated and well washed carbonate of zinc is made into a thin paste with water, pure valerianic acid added, without more water, in the same proportion as before, and the mass dried at a gentle heat.

Carbonate of zinc, especially when freshly precipitated, is readily dissolved by an aqueous solution of valerianic acid, valerianate of zinc being formed, and carbonic acid evolved. 2134 parts of basic carbonate of zinc, require 4500 parts of the terhydrated acid, the action is promoted by a gentle heat, a strong heat is disadvantageous, as the salt dissolves more readily in cold than hot water; for this reason sufficient water for its solution in the cold is employed; it can be obtained in the dry state only by evaporation, and of course is not thrown down from a hot solution on cooling; for the same reason it is better to separate the crystals from the solution while warm. If, during evaporation, the solution is allowed to boil, the salt adheres to the bottom of the dish, instead of being obtained in a loose, finely-divided state.—*Witt.*

The Dublin Pharmacopœia recommends the following process: Take of valerianate of soda two and a half ounces (avoird.), and dissolve it in distilled water one pint (Imperial measure). Also dissolve separately, sulphate of zinc two ounces and seven drachms (avoird.) in one pint, Imperial measure, of distilled water. Heat both solutions to 200° F., mix them, and skim off the crystals which are produced. Then evaporate the solution at a temperature not to exceed 200° F., until it is reduced to the bulk of four ounces, removing, as before, the crystals from the surface, in proportion as they form, and placing them with those already obtained. The salt thus procured is to be steeped for an hour in as much cold water as is just sufficient to cover it, in order to remove any adhering sulphate of soda, then transferred to a paper filter, on which it is first to be drained, and then dried at a heat not exceeding 100° F.

Anhydrous valerianate of zinc, $Zn\,O\,\overline{Va}$, crystallizes in snow-white, exceedingly light plates, of a mother-of-pearl luster, and resembling boracic acid; it has a faint valerianic acid smell, and a bitter, metallic taste, combined with that of valerian. When heated it fuses, gives off thick white vapors, ignites, burns with a bluish-white flame, leaving pure oxide of zinc, mixed with a little metallic zinc, which burns, and the heated particles of oxide impart the luminosity to the flame. It dissolves in ninety parts of water at the ordinary temperature, and in sixty parts of alcohol 80 per cent.; the solutions have an acid reaction, become turbid when warmed, and clear again on cooling. Cold ether dissolves $\frac{1}{500}$, boiling ether $\frac{1}{20}$th its weight.

The hydrated salt is not different in appearance from the anhydrous; its formula is $Zn\,O\,\overline{Va}+12\,HO$. At 212° F., it loses its water of crystallization, or 44 pr. ct. in weight. It is soluble in 44 parts of cold water.

Butyrate of zinc has been fraudulently sold for the valerianate; it may be detected by adding sulphuric acid to the salt, and distilling the mixture to separate the volatile acid. If this be butyric acid, it immediately causes a bluish-white precipitate when added to a concentrated solution of acetate of copper; whereas, valerianic acid causes no precipitate; but, on shaking it with the solution, it gives rise to some oily drops of anhydrous valerianate of copper. This may be distinguished by its odor, and by its yielding acetic ether (also recognized by its odor), when mixed with a little proof-spirit and one-fourth of the volume of oil of vitriol. (Larocque and Huraut, *Chemical Gazette*, *IV.*, 302.

Valerianate of zinc has been employed as an antispasmodic in neuralgia, chorea, epilepsy, nervous headache, hysteria, and other nervous diseases. The dose of it is from one to three grains, two or three times a day, in pill form, or in solution. By some practitioners it is said to have produced no beneficial results. As a topical astringent and sedative, a collyrium composed of from two to four grains of the salt, in one or two fluidounces of distilled water, has been employed in chronic conjunctivitis.

EXPLANATION

OF THE

PRINCIPAL ABBREVIATIONS

OCCURRING IN

PHARMACEUTICAL FORMULÆ.

R. Recipe—Take.

F. S. A. Fiat secundum artem—Let it be made or prepared according to the rules of the art.

M. Misce—Mix.

M. S. D. Misce, signa, da—Mix the medicine, and deliver it afterward, with the requisite instruction, to the patient (or nurse) in writing.

M. F. P. Misce fiat pulvis—Mix to form a powder.

M. F. Mixt. Misce fiat mixtura—Mix to form a liquid mixture.

M. F. Pil. Misce fiant pilulæ—Mix to form pills.

Div. Divide—Divide.

Sol. Solve—Dissolve.

Fasc. j. Fasciculus—An armful.

Man. j. Manipulus—A handful, a gripe.

Pugil. j. Pugillus or Pugillum—A pinch.

Cyat. j. Cyathus—A glassful.

Cochl. j. Cochlear or Cochleare—A spoonful.

Gutt. Gutta—Drop.

No. 1, 2, 3, etc. The number of pieces or parts.

Ana, or āā. Of each.

P. Ae. Partes æquales—Equal parts.

Q. S. Quantum sufficit—As much as will suffice.

Q. L. Quantum libet—As much as you like.

Q. V. Quantum volueris—As much as you like.

℔. Libra—A pound.

℥. Uncia—An ounce.

ʒ. Drachma—A drachm or dram.

℈. Scrupulus—A scruple.

Gr. Granum—A grain.

Pil. Pilula—A pill.

Pot. Potio—A potion.
Pulv. Pulvis—A powder.
Tinc. Tinctura—A tincture.
Ext. Extractum—An extract.
Chart. Chartula—A small paper.
Collyr. Collyrium—An eye-water.
Collutor. Collutorium—A mouth wash.
Cong. Congius—A gallon.
O. Oct. Octarius—A pint.
f℥. Fluiduncia—A fluidounce.
fʒ. Fluidrachma—A fluidrachm.
♏. Minimum—A minim.
Decoct. Decoction—A decoction.
Garg. Gargarisma—A Gargle.
Haust. Haustus—A draught.
Infus. Infusum—An infusion.
Mass. Massa—A mass.
Mist. Mistura—A mixture.
Ss. Semis—A half.

A VOCABULARY

OF THE WORDS MOST FREQUENTLY OCCURRING IN THE PRESCRIPTIONS OF PHYSICIANS.

A.

A, āā, or ana, of each ingredient; more properly expressed by the genitive case plural (singulorum) of each; for instance:
℞.—Aquæ cinnamon, tinct. rhei. āā ʒij, means.
Take of cinnamon-water, and tincture of rhubarb, of each two drachms.

Abdomen, the belly. Gen.—inis, of the belly. Dat.—ini, to the belly.

Absente febre, while the fever is off.

Accuratè (adverb) accurately. Accuratè pensi, Acc. pen., weighed with the utmost exactness. Accuratè misceantur, Acc. mis., mix very completely.

Aciditas, sharpness. Ad gratam aciditatem, make it just acid enough to be palatable, and not too sour.

Acme, the hight of the fever or any other disease.

Ad, to. Ad duas vices, at twice taking. Ad libitum, as you like.

Adde, add. Addantur, let there be added. Addendus, to be added. Addendo, adding.

Admoveatur, let there be applied—antur, plural, when more than one is to be applied.

Adstante febre, while the fever is on.

Æger, a sick person, a patient. Ægra, a female patient.

Aggrediente febre, when the fever is coming on.

Aggressus, an attack. Aggressus febris, the attack of a fever.

Agitato vasè, shaking the vial.

Albus, white.

Aliquot, some. Aliquoties, sometimes.

Alter, altera, alterum, the other.

Alternus, alternate. Alternis horis, every second hour. Alternis diebus, every alternate day.

Aluta, leather. Extende super alutam mollem, E. S. A. M., spread on soft leather.

Alvus, the belly, the bowels. Adstrictâ alvo, when costive.

Amplus, large. Cochleare amplum, a tablespoonful.

Antè, before. Ut antè, as before.

Antemeridianus, in the forenoon; any time before twelve o'clock at noon.

Apparatus, any sort of a preparation, instruments, or, in short, everything that is requisite to be had in readiness for performing any sort of operation. Also, the more delicate term for a bladder and pipe for clysters.

Aperiens, opening, gently purging.

Applicetur, let there be applied.

Aqua, water. Aquæ, of water. Aqua bulliens, Aqua fervens, boiling water.

Armatus, armed. Fistula armata, an apparatus for clysters; a pipe and bladder.

Auris, the ear. Auri, to the ear. Aures, ears. Auribus, to the ears.

Aut, or.

B

Benè, well. Benè misceatur, B. M., let it be well mixed.

Bibat, let him drink.

Biduum, two days. Omni biduò vel triduò, every two or three days.

Bihorium, the space of two hours. Omni bihorio, every two hours.

Bis, twice: bis, terve, twice or thrice.

Bullio, to boil; bulliens, boiling. Aquæ bullientis, of boiling water.

Bulliant, let them boil.

C.

Calefactus, made warm.

Capiat, let (the patient) take. Capt. cochl. iij magn., three tablespoonfuls to be taken.

Catharticus, purging.

Cautè, cautiously.

Cerevisia, beer. Cerevisia Londinensis, porter. Cerevisia Lagenaria, bottled porter or stout.

Charta, paper. Charta cærulea, blue paper. Chartula, a little piece of paper. Cola trans chartam, filter through paper.

Cibus, food.

Circa, about. Circiter, about.

Citò, soon, quickly. Citissimè (the superlative degree,) as quick as possible.

Clausus, clausa, clausum, covered. Vase clauso, in a covered vessel.

Cochleare, a spoonful. Cochlearia, spoonfuls. Coch. magnum, amplum, a tablespoonful. Co. infantulorum, coch. modicum, child's spoonful, a dessertspoonful. Co. parvum, a teaspoonful.

Coctio, a boiling. Sub finem coctionis, toward the end of the boiling; when almost boiled.

Cæruleus, blue. Charta cærul., blue paper. Unguentum cæruleum, mercurial ointment.

Cola, (imperat. of Colo,) strain, to filter.

Colatus, strained, filtered. Colato liquori, to the strained liquor.

Colatura, a straining. Colaturæ, to the strained liquor.

Colatus, let be strained. Colentur, let them be strained.

Collum, a neck.

Comp., Compositus, compound.

Continuo, to continue. Continuantur remedia, go on with the same medicine as last prescribed.

Contundo, to bruise. Contusus, bruised.

Contusio, a bruise, a contusion.

Coquo, to boil. Coque, boil. Coque parùm, boil a little while.

Coquantur, let them be boiled.

Cor, the heart. Scrobiculus cordis, the pit of the stomach.

Coxa, Coxendix, the hip.

Cras, to-morrow; c. m. cras mane, early to-morrow morning; C. M. S., cras mane sumendus, to be taken early to-morow morning.

Crastinus (adj.,) of to-morrow. In usum crastinum, for to-morrow's use.

Cribrum, a sieve. Trans cribrum, through a sieve.

Cujus, of which. Cujus capiat, or sumat, of which (the patient is to) take.

Cum, with.

Cyathus, a cup. Cyathus vinarius, a wineglass. Cyath. theat, a teacup full.

D.

Da, give. Detur, dentur (plural,) let be given.

De, of. De quo, or quâ, of which. De die, in a day.

Deauratus, gilt. Deaurentur pilulæ, let the pills be gilt.

Debilitas, weakness.

Decem, ten. Decimus, the tenth.

Debitus, due. Ad debitam spissitudinem, to a proper degree of thickness, as to consistence.

Decubitus, lying down. Horâ decubitûs, at bedtime.

Deglutio, to swallow. Deglutiatur, is swallowed—etur, let be swallowed.

Dein, deinde, then; afterward.

Dejectio, a depositing, or putting down, also a going to stool; as, post duas dejectiones alvi, after two motions.

Dejitio, to deposit. Donec alvus bis dejiciat, until the patient shall have had two stools.

Dexter, the right. Manus dextra, the right hand. Auri dextro, to the right ear.

Dictus, spoken of, said.

Dies, a day. Die in a day; as bis die, twice a day. Diebus, in days; as, tertiis diebus, every third day. Alternis diebus, every alternate day.

Dilutum, diluted.

Dimidium, the half. Dimidius, a, um (adjective,) half.

D. P., Directione propria, with its proper direction.

Diu, a long time. Tere diu, rub for a long time.

Diuturnus, long-continued. Diuturnà trituratione, D. trit. by long continued rubbing, or grinding in the mortar. Diuturna coctione, by long boiling.

Dolor, pain. Dolores, pains. Doloris, of the pain.

Dolens, pained. Parti dolenti, to the pained part.

Donec, until. Donec liquescat., till it melts. Dum, whilst.

Durante dolore, while the pain continues.

E.

Eadem, eandem, the same. Eodem, in the same.

Effunde, pour out.

Effervescentia, the effervescence.

Effervescet, effervesces.

Ejusdem, of the same, the genitive case of idem.

Enema, a clyster. Enemata, clysters.

Erit, shall be.

Evanesco, evanui, to disappear. Evanuerit, shall have disappeared.

Exhibe, Exhibeatur, give. Exhibendus, to be given.

Extendo, to extend, also to spread. Extende super alutam, spread it on leather.

Extensus, a, um, spread.

F.

Fac, make. Fac in pilulas xij, make into twelve pills.

Farina, flour. Farina seminis lini, linseed meal.

Febris, a fever. Febre durante, while the fever is on.

Femur, a thigh.

Femoribus, to the thighs. Femoribus internis, to the inner sides of the thighs.

Fervens, boiling. Fervidus, fervida, hot.

Ferventis, of boiling. ℞ aq. ferventis, take of boiling water.

Finis, the conclusion. Sub finem coctionis, when almost boiled enough.

Fiat, make (the singular number). Fiant, make (plural).

Fontana, fountain. Aqua fontana, spring water.

Formula, prescription.

Fotus, a fomentation.

Fuerit, shall have been ; as, donec alvus soluta fuerit, until a motion is (or shall have been) procured.

G.

Gargarisma, a gargle.

Gelatina, jelly. Gelatina ribesiorum, currant jelly. Gelatina quovis, any sort of jelly.

Globulus, a little ball. Globuli Gascoigni, Gascoign's ball. Donec globuli evanuerint, until the globules (of quicksilver) totally disappear (so that they can not be seen even with a microscope).

Gradatim, by slow degrees.

Gratus, grata, gratum, agreeable, pleasant. Ad gratum aciditatem, so as to make it pleasantly acid without being too sour. In quovis grato vehiculo, in any agreeable vehicle.

Gutta, a drop. Guttæ, drops. Guttas, drops.

Guttatim, drop by drop.

H.

Hac, this. Hac nocte, this night. Hanc, this. Sumat hanc, let him take this.

Hactenus, hitherto, heretofore, up to the present day.

Harum, of these. Harum pilularum sumat tres, of these pills let him or her take three.

Haustus, a draught.

Hebdomada, a week.

Heri, yesterday. Ut heri, as yesterday.

Hesternus, of yesterday. Hesterna nocte, last night.

Hirudo, a leech. Hirudines, leeches.

His, in these, to these. His adde, add to these.

Hora, an hour. Horæ, of an hour. Horæ, (plural) hours.

H. S. (horâ somni,) at the hour of rest.

H. S. S. (horâ somni sumendus,) to be taken at bedtime. Hora decubitus, at the hour of going to rest, bedtime.

Horâ vespertinâ, in the evening.

Horæ unius spatio, in the space of one hour.

Horæ $\frac{1}{4}$, horæ quadrante, quarter of an hour.

Horis intermediis, at intermediate hours, when two medicines are to be taken. Horis intermediis, means that one is to be given exactly at midtime from the other: suppose a draught is ordered (to be taken every six hours,) and a powder horis intermediis, that is, every six hours intermediately, then a draught will be taken at six o'clock and at twelve, and a powder at three and at nine.

Hujusmodi, of this sort, like these.

H. P. N., Haustus purgans noster, a formula of purging draught made according to a practitioner's own private Pharmacopœia, and is prepared so as to keep a long time without spoiling, that we may not have the trouble of preparing it every time a draught is wanted. Mitt. H. P. N. ℥ij ad ij Vices C. M. S. Mitte Haustus purgantis nostri uncias duas, ad duas Vices cras mane sumendus; send two ounces of our purging draught, to be taken to-morrow morning, at twice, that is half at first, and the remaining half in an hour if the first does not operate.

I.

Idoneus, proper, appropriate.

Idem, eadem, the same. Ejusdem, of the same, the genitive case of Idem.

Imponatur, (sing.,) let there be put on—nantur (plural).

Imprimis, first.

In, in. In die, in a day.

Indiès (an adverb,) every day, daily.

Indicaverit, shows, indicates.

Infus. panis tostus, toast bread water.

Infusio, infusum, an infusion.

Infunde, infundatur, infuse.

Inter, between.

Injectio, injection.

Inquietudo, restlessness. Ungente inquietudine, if restless.

Injiciatur, throw in, throw up. Injiciatur enema, let a clyster be administered.

Injiciendus, injiciendum, to be administered.

Instar (an adverb,) as big as. Sumat molem instar mucis moschatæ, the bigness of a nutmeg to be taken.

Intermedius, intermediate.

Internis, the inner side.

J.

Jam, already. Jampridem, jamdudum, some time ago, heretofore.

Jugulum, the throat.

Jusculum, broth. Jusculum ovillum, mutton broth. Jus. bovinum, beef tea.

Juxta, near to.

L.

Lac, milk. Lactis, of milk. Lacte, in milk.

Lævigatus, levigated.

Lana, flannel. Lana nova, new flannel.

Languor, faintness, lowness. In languoribus, in the fainting fits, when low and faint.

Latus, the side. Lateris, of the side. Lateri, to the side. Latus dolens, the pained side. Lateri dolenti, to the pained side.

Latus, lata, latum (adjective,) broad.

Lectus, a bed. In lecto, in bed.

Liber, a book.

Libet (a verb impersonal,) it pleases. Ad libitum, just as you please.

Libra, a pound. Libris, libras, pounds.

Linteum, lint; also linen.

Liquesco, to liquefy, to melt. Donec liquescat, till it melts.

Liquidus, liquid. Sedes liquidæ, loose stools. In quovis liquido, in any liquid.

Londinensis, of London. Pharmacopœia Londinensis, the London Dispensatory.

Lumborum, of the loins.

M.

Magnus, magna, magnum, large. Magnum cochleare, a tablespoonful.

Major, greater, larger. Cochlearia duo majora, two tablespoonfuls.

Maximus, the greatest. Maximâ curâ, with the greatest care.

Maximè, chiefly.

Malleolus, the ankle. Malleolus internus, the inner ankle.

Manè, in the morning. Manè primo; valde mane, very early in the morning.

Manus, a hand. Manu calefacta, with a warm hand.

Massa, a mass. Massa pilularis, a mass fit for forming into pills.

Matutinus, in the morning or forenoon.

Mediocris, middle-sized. Pilulæ mediocris, middle-sized pills. Cochleare mediocre, a dessertspoonful, a papspoonful, or a child's spoonful. Mediocris also means indifferent, as to quality.

Medius, middle. Media nocte, in the middle of the night.

Melior, melius, better.

Mica panis, crumb of bread.

Minatur, minaretur, threatens. Minante, threatening.

Minimus, very small. Cochleare minimum, a teaspoonful.

Minutum,* a minute.

Misce, mix. Bene misceatur, let it be well mixed.

Mitte, send.

Mittatur (singular,) let it be sent. Mittantur (plural,) let them be sent.

Mittatur sanguis, take blood away; *i. e.*, bleed the patient.

Mistura, mixtura, a mixture.

Mitigatio, mitigation, alleviation. Donec dolor is mitigatio sit, until the pain is easier.

Mitigatus, a um, mitigated, lessened.

Modicus, middle-sized.

Modus, a manner. Modo præscripto, in the manner directed.

Moles, a mass, a lump, a piece. Sumat molem instar nucis moschatæ, let him (or her) take the bigness or size of a nutmeg.

Mollis, molle, soft.

Molestus, troublesome. Molestor, to trouble, to be troublesome. Molestante dolore, when the pain is troublesome. Molestante tussi, when the cough is troublesome.

Mora, delay. Sine morâ, without delay.

Mos, moris, manner. More solito, in the usual manner; also, in the same manner as I am in the habit of prescribing it to other people.

Mortarium, a mortar. Mortario aheneo, in the brass mortar. Mortario marmoreo, in the marble mortar. Mort. vitreo, in the glass mortar.

N.

Narthecium, a gallipot.

Nates, the buttocks.

Ne, lest, also, do not; as ne tradas sine nummo, N. T. S. N., do not deliver the medicine without the money.

Necnon, also.

Niger, nigra, nigrum, black.

Ni, nisi, unless.

Nihil, nothing.

Nisus, an endeavor, an attempt, a straining, a motion, a straining to vomit, or go to stool.

Nimis, nimium, too much.

Nodulus, a little knot. Nodulo ligati, tied up in a piece of clean rag.

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* The word minutum, for a minute, is very barbarous Latin; we believe there is no such word; but the right Latin for a minute, Sexagesima pars horæ, is as long and as tiresome to write as "Semivitreous oxide of lead," for the simple word "Litharge."—*Griffith.*

Nomen, nominis, a name. Signetur nomine proprio, S. N. P., write its common name upon the label.

Novem, nine.

Nonus, the ninth.

Novus, nova, novem, new.

Novissimè, very lately, the last of all.

Nocte, at night. Noctes, nights. Nocte maneque, night and morning. Alternis noctibus, every second night.

Nuper, lately. Nuperrime, very lately.

Nucha, the nape of the neck. Nuchæ, to the nape.

N. M., Nux moschata, a nutmeg. Sumat magnitudinem nucis moschatæ, take the bigness of a nutmeg.

Numeri. Numbers.

1.	or j.	unus, una, unum, one. unius, of one.
2.	ij.	duo, duæ, two. duorum, of two duobus, in two, to two.
3.	iij.	tres, tria, three. tribus, in three, to three. trium, of three. ter, three times.
4	iv.	quatuor, four. quartus, a, um, fourth quater, four times.
5.	v.	quinque, five. quintus, fifth.
6.	vj.	sex, six. sextus, sixth.
7.	or vij.	septem, seven. septimus, seventh. septimana, or 7 mana, a week.
8.	viij.	octo, eight. octavus, eighth
9.	ix.	novem, nine. nonus, ninth.
10.	x.	decem, ten. decimus, tenth.
11.	xj.	undecim, eleven.
12.	xij.	duodecim, twelve.
20.	xx.	viginti, twenty.
24.	xxiv.	viginti quatuor, twenty-four.

O.

Obstante, hindering, preventing.

Occasio, occasion, opportunity.

Octo, eight.

Octavus, eighth. Octava quaque horâ, every eighth hour.

Olim, some time ago.

Olla, a pot, a gallipot.

Omnis, all. Omni mane, every morning. Omni horâ, every hour. Omni bihorio, every two hours. Omni nocte, every night. Omni $\frac{1}{4}$ horâ, Omni quadrante horæ, every quarter of an hour. Tere omnia, rub all together.

Omninò, quite, wholly, entirely.

Optimè, very well, as well as possible.

Optimus, ma, mum, best.

Opus, need, occasion. Si opus sit, or fuerit, if it be necessary.

Ovillum jusculum, mutton broth.

Ovum, an egg. Vitell. ovi, the yelk of an egg. Ovorum, of eggs.

P.

Panis biscoctus, biscuit. Panis nauticus, sea biscuit. Panis tostus, toast bread. Infus. panis tostus, toast-bread water. Panis triticus, wheat bread.

Pannus, a rag. Pannus linteus, a linen rag. Pannus laneus, Pannus è lanâ, a piece of flannel.

Paroxysmus, a paroxysm, a fit, a convulsion fit.

Pars, a part. Partes, parts. Parti dolenti, to the pained part.

Partitus, parted. Partitus vicibus means, that you are not to give a medicine all at once, but divide the dose according to the directions most commonly previously given; for example, if a purging or emetic draught, half or a third, (as the case may be,) to be taken at first, and the other half or third at a certain distance of time, if the former quantity be not found sufficient to produce the desired effect.

Parvus, little. Cochleare parvum, a teaspoonful.

Parum, a little. Parumper, a little.

Pauculum, pauxillum, paululum, a little.

Pectus, the breast. Pectoris, of the breast.

Pediluvium, a bath for the feet.

Per, by, or through.

Pergo, to go on with. Pergat in usu medicinarum, continue the medicines as before.

Peractus, }
Perfectus, } completed, perfected, quite done, gone through with; as, Peractâ operatione emetici, after the emetic has quite done operating.

Perfricetur, let it be rubbed. Perfricandus, to be rubbed.

Pensus, weighed. Accuratè pensi, weighed exactly.

Perpetuus, perpetual. Fiat perpetuum, keep it open, (when it refers to a blister).

Pluvialis, also pluviatalis aqua, rain water.

Pharmacopœia, the dispensatory.

Pollex, the thumb. Pollex pedis, the great toe.

Pomeridianus, postmeridianus, in the evening or afternoon, time of the day.

P. R. N., Pro re natâ, occasionally, according as circumstances may occur, according as the symptoms may require.

Poculum, a cup.

Pomum, an apple. Pomi, of an apple.

Pone, behind. Pondere, by weight.

Porro, moreover. Post, after. Postea, then, afterward.

P. M., Post meridiem, afternoon, in the afternoon, after twelve o'clock at noon.

Potus, drink, beverage of any kind.

Postulet, postulent, may require, demand.

Præcipue, especially.

Præparatus, prepared.

Præparo, to prepare. Præparentur, let them be prepared.

Primus, ma, mum, the first. Primò, first of all. Primo mane, very early in the morning.

Prior, prius, the former, the first.

Priusquam, before that.

Pro, for. Pro re natâ, P. R. N., occasionally, etc. Pro ratione, according to, or in proportion to; as pro ratione ætatis, according to the age of the patient.

Proprius, a um, proper. S. N. P., Signetur nomine proprio, mark it with its proper direction.

Pruritus, an itching. Pruriens, itching. Dolichos pruriens, cowhage.

Psora, the itch.

Pulvis, a powder. Pulveres, powders. Pulveribus, in powders.

Pulvis subtilissimus, the very finest powder.

Purificatus, a um, purified.

Pyxis, pyxidis, a pill-box, or lozenge-box.

Q.

Quadrans, quadrantis, quadrante, quarter. Omni quadrante horæ, every quarter of an hour.

Quacum, with which.

Quamprimum, as soon as possible, without the least delay.

Quartus, a, um, the fourth.

Quâqua, every. Quâvis, (fœm.) with any.

Quater, four times. Quatuor, four. Quarta pars, a fourth part.

——que, (at the end of any Latin word,) and.

Quem, quam, quod, which, (the accusative case).

Qui, quæ, quod, which, (the nominative case).

Quibus, to which, with which.

Quibusdam, to or with some. Cum guttis quibusdam, with a few drops.

Quilibet, quælibet, quodlibet, gen. Cujuslibet, abl. Quolibet, any.

Quiescat, goes to rest, is easier.

Quinque, five. Quintus, a, um, the fifth. Quinquies, five times.

Quinquina, (cinchona,) Peruvian Bark.

Q. S.—q. s., Quantum sufficiat, as much as may be sufficient.

Quorum, quarum, of which. Quos, quas, which. Quocum, quacum, with which. Quovis, with any.

R.

Ratio, a reason, also a proportion. Pro ratione ætatis, according to the age of the patient. Pro ratione doloris, according to the urgency of the pain.

Raucedo, hoarseness.

Recipe, take. Recipe, (taken substantively,) a prescription.

Regio, a region, (an anatomical term for certain parts of the body); as, regio epigastrica, the epigastric region; regio lumborum, the region of the loins; appl. emplastr. regioni umbilicali, to the umbilical region, or parts in the neighborhood of the navel.

Redigo, to reduce. Redige, reduce. Redigetur, may be reduced. Redigatur, let it be reduced.

Redactus, a, um, reduced. In pulv. redact., reduced to powder.

Refrixerit—pl. int.—the subjunctive future of refrigesco, to cool.

Reliquus, a, um, the rest, the remaining part.

Remedium, a remedy. Continuandur remedia, go on with the same remedies as before.

Repetatur, let be repeated, repeat.

Repetendus, to be repeated.

Respondeo, responderit, shall have answered. Donec alvus ad sedes ij vel iij responderit, until two or three stools shall have been procured.

Ribes, currants. Gelatina ribesiorum, currant jelly.

Ruber, rubra, rubrum, red.

Rubus idæus, raspberry.

Retinendus, to be retained, or kept.

S.

S. V. R., spiritus vinosus rectificatus, rectified spirit of wine.

S. V., Ten, or tenuis, proof spirit.

Sæpe, often; sæpius, oftener; sæpissime, very often.

Saltem, at least.

Sanguis, blood,—inis, of blood. Sanguinis missura, blood-letting.

Saphena vena, the ankle vein.

Scapula, the shoulder blade. Inter scapulus, between the shoulders.

Scilicet, to wit, namely.

Scrobiculus cordis, the pit of the stomach.

Secundus, a, um, (adjective,) second.

Secundum, (preposition,) according to.

S. A., Secundum artem, according to art; that is, you are to use your own ingenuity to do it in the most proper and scientific way.

Sed, but.

Sedes, a stool—plural, stools.

Semi, or semis, half. Semihora, half an hour. Semidrachma, half a drachm.

Sesqui, one and a half; as, sesquihora, an hour and a half. Sesquinuncia, or sescuncia, an ounce and a half. Sesquidrachma, a drachm and a half. Remember well to attend to the difference between these two words, for many young men, by not knowing that sesqui means one and a half, but confounding it with semi, have made bad mistakes.

Semper, always.

Semel, once.

Septem, seven.

Septimana, a week, seven days. Septimus, seventh.

Sequens, following.

Serum lactis, whey. In sero lactis vinoso, in wine whey.

Serum is also the watery part of the blood which separates from the red part, or crassamentum, on standing until cold.

Sex, six; Sextus, sixth.

Si, if. Sive, or, whether.

Signatura, a label or direction.

Signetur, let it be marked, directed, written upon.

S. N. P., Signetur nomine proprio, mark it with the name it is usually known by.

Simul, together; as, terantur simul, let them be rubbed together. Simul ac, at the same time that.

Sine, without. Sine morâ, without delay.

Singultus, hiccup.

Singulus, a, um, each; in singulis, in each; singulorum, of each.

Sinister, tra, trum, the left. Auri sinistro, to the left ear.

Satis, thirst; si sitiat, if thirsty.

Solitus, accustomed.

Solus, alone; only.

Solutus, a, um, dissolved, also loosened; as, donec alvus soluta fuerit, until a stool is procured.

Solve, dissolve.

Somnus, sleep. Hora somni, at bed-time.

Spina, the spine, the backbone; also, a thorn.

Spissus, thick. Spissitudo, thickness of consistence.

Statim, directly, immediately.

Stent, let them stand. Stet, let it stand.

Sternutatorius pulvis, sneezing powder, snuff.

Stupa, tow.

Sub, subter, under. Sub finem coctionis, when the boiling is almost finished. Sub, prefixed to a word, implies diminution, or a process not completed; also, in many words has the same signification as the termination ish in English words, as subniger, blackish, not quite black. Subtepidus, lukewarm. For its meaning when applied to terms of chemistry, as subcarbonas, submurias, the pupil must study his chemical nomenclature.

Subactus, a, um, subdued, dissolved.

Subitus, a, um, Subitaneus, sudden. Subito, (adv.,) suddenly.

Subtepidus, a little warm, lukewarm.

Subige, dissolve it, make it unite. Subdue quicksilver with lard or balsam of sulphur.

Subinde, frequently, now and then.

Subtilis, subtle, reduced to fine powder. Pulv. subtilissimus, the very finest powder.

Succ. pom. ferment., cider.

Sumat, let him take. Sumatur, sumantur, let it be taken, take.

Sudor, sweet.

Superbibo, to drink after taking anything; as, chamomile tea or warm water after an emetic; or a cup of water, or any liquid medicine, to wash down a dose of any sort of pills.

Superinfundo, to pour upon.

Supra, above. Supradictus, above mentioned.

Syncope, a fainting fit.

T.

Tabellæ, tabulæ, lozenges.

Talis, such. Sumat talem, let him take such a one as this.

Talus, the ankle.

Tam, so. Tamen, yet.

Tactus, the touch.

Tænia, the tapeworm,

Tempus, temporis, time.

Tempora, the temples. Temporibus, to the temples. Tempori dextro, to the right temple. Tempori sinistro, to the left temple.

Temperies, temperamentum, temperament, degree of heat.

Tenacitus, tenacity. Ad debitam tenacitatem, of a proper degree of tenacity or consistence.

Teneo, to hold. Tenendus, to be held.

Tenuis, weak, thin, small, slender.

Tepefactus, warmed, made warm.

Ter, three times, thrice. Ter quaterve, three or four times.

Teres, teretis, round, taper; also, teres is a name for the long and round worm infesting the human body, qu. d. vermis teres.

Tergum, the back. A tergo, behind.

Tero, to rub. Tere, (imperative,) rub. Terendus, to be rubbed. Terantur, let them be rubbed.

Tertius, tertia, tertium, the third.

Testacea, the prepared powders made of oyster shells, egg shells, crabs' claws, etc.

Thorax, the chest. Thoracis, of the chest.

Thus, frankincense.

Tinea capitis, scald head.

Torrefactus, toasted.

Tres, tria, three; tribus, in three, to three.

Triduum, three days.

Trituratio, a grinding. Trituratus, triturated, ground. Tritus, ground. Trituratur exactissima minutes decem, Trit. ex. min. dec., T. E. M. D., triturate exactly ten minutes. Trituratur intime commisceantur, Trit. int. com., triturate intimately or accurately together.

T. O., Tinctura Opii, what is commonly called Laudanum.

T. O. C., Tintura Opii Camphorata, Camphorated Tincture of Opium, formerly called Paregoric Elixir. This tincture is now called, by the London College, in the late reform of the Pharmacopœia, edit. 1809, Tinctura Camphoræ Composita.

Trans, through. Cola trans chartam, filter through filtering paper.

Tussis, a cough. Tussi molestante, when the cough is troublesome.

U.

Ultimus, ultima, um, the last. Ultimó præscript, which was last prescribed.

Umbilicus, the navel.

Unà, (an adverb,) together.

Uncia, an ounce. Unciam cum semisse, an ounce and a half.

Undecim, eleven.

Unus, una, unum, one. Unius, of one. Uni, to one.

Urgente tussi, when the cough is troublesome.

Urgeo, to urge, to oppress, to be troublesome, or painful.

Usus, use. Pergat in usu remediorum, continue the use of the medicine as before.

Usque ad, up tó, as far as.

Ut, as, that, so that; in the same manner as.

Utendus, to be used.

Utatur, let him make use of.

Uterque, utraque, utrumque, both. Utriusque, of both. Utrique, to both, to either, Admoveantur hirundines ij tempori utrique, apply two leeches to each temple.

Utriuslibet, of whichever of the two, or more, the patient likes best.

V.

Vaccinatio, the act of inoculating for the cowpock.

Variolæ vaccinæ, the cowpock.

Vaccinum lac, cow's milk.

Valde, very, very much.

Valeo, to avail; si non valeat, if it does not answer.

Variolæ, the small-pox.

Varicella, the chicken-pox.

Vas, a vessel. Vasis, of a vessel. Vase clauso, in a covered vessel. Agitato vase, shaking the vessel.

Ve, vel, or; either: -ve is never at the beginning but the end of a word.

Vertebræ, the joints of the neck, back or loins; the vertebræ altogether form that column of bones which is called the spine.

Verus, true, real, genuine.

Vena, vein. Vena saphena, the ankle vein.

Venæsectio, bleeding. Fiat venæsectio, bleed him.

V. S. B., Venæsectio brachii, bleeding in the arm. Fiat venæsectio in venâ saphena, bleed the patient in the ankle vein,—or it may be understood, to bleed wherever you can find the best vein, at the top of the foot, to get blood from.

Vespere, in the evening.

Vespertinus, in the evening; as, horâ vi'a, vespertina, at six o'clock in the evening.

Vehiculum, a vehicle; that is, whatever liquid, or any other eatable or drinkable we take a medicine in, as barley water, whey, jelly, or panada, etc.

Viginti, twenty. Vicesimus, vigesimus, the twentieth.

Vinosus, vinarius, of wine. Cyathus vinarius, a wineglass.

Vices, turns; ad duas vices sumendus, to be taken at twice: that is, half to be taken at first, and the other half in some time after.

Vicibus partitis. See Partitus, in P.

Vice, in the room of. Vix, scarcely, hardly. Ut vix sentiatur, so that it can scarcely be perceivable.

Vitellus, the yelk of an egg.

V. O. S., Vitelli Ovi Solutum, dissolved in the yelk of an egg.

Vitrum, a glass. Vitreus, made of glass.

Vires, strength; si vires permittant, if the strength will bear it.

Vomitio, a vomiting. Vomitione urgente, when the vomiting is troublesome.

Vultus, the countenance.

COMPARISON OF THE DIFFERENT THERMOMETRIC SCALES.

The Thermometer always used in this country is that of Fahrenheit; it is also used in parts of Germany.

In this instrument the range between the freezing and boiling points of water is divided into 180°, and as the greatest possible degree of cold was supposed to be that produced by mixing snow and salt together, it was made the zero. Hence, the freezing point became 32°, and the boiling point 212°.

The Centigrade thermometer places the zero at the freezing point of water, and divides the range between the freezing and boiling points into 100°. This scale has long been used in Sweden, under the title of Celsius's thermometer, and is generally adopted on the Continent.

Reaumur's thermometer, which was formerly used in France, divides the space between the freezing and boiling points of water into 80°, and places the zero at the freezing point. It is now little employed.

Le Lisle's thermometer is used in Russia. The graduation begins at the boiling point, and increases toward the freezing point. The boiling point is marked 0°, and the freezing point 150°.

To convert the degrees of Centigrade into those of Fahrenheit, multiply by 9, divide by five, and add 32.

To convert the degrees of Centigrade into those of Reaumur, multiply by 4, and divide by 5.

To convert the degrees of Fahrenheit into those of Centigrade, deduct 32, multiply by 5, and divide by 9.

To convert the degrees of Fahrenheit into those of Reaumur, deduct 32, divide by 9, and multiply by 4.

To convert the degrees of Reaumur into those of Centigrade, multiply by 5, and divide by 4.

To convert the degrees of Reaumur into those of Fahrenheit, multiply by 9, divide by 4, and add 32.

TABLE OF PROPORTIONATE DOSES FOR DIFFERENT AGES.

GAUBIUS' TABLE.

				Examples.
Under ½ year,	1-15th	of a full dose.	or	4 grains.
“ 1 “	1-12th	“ “	“	5 “
“ 2 “	1-8th	“ “	“	7½ “
“ 3 “	1-6th	“ “	“	10 “
“ 4 “	1-5th	“ “	“	12 “
“ 7 “	1-3d	“ “	“	20 “
“ 14 “	1-half	“ “	“	30 “
“ 20 “	2-3ds	“ “	“	40 “
“ 21 “	the full dose			1 drachm.
“ 63 “	11-12ths	“ “	“	55 grains.
“ 77 “	5-6ths	“ “	“	50 “
“ 100 “	2-3ds	“ “	“	40 “

The following is the more simple rule of Dr. Young:

"For children under 12 years, the dose of most medicines must be diminished in the proportion of the age to the age increased by 12; Thus, at 2 years, the dose will be 1-7th of that for adults, viz: $\frac{2}{2+12}=\frac{1}{7}$. At 21 the full dose may be given."

To the above rule there are certain exceptions; thus castor-oil requires to be given in larger proportionate doses, while opium and narcotics generally should be administered in smaller proportionate quantities.

Sex, temperament, and idiosyncrasy have also a modifying effect upon the dose, and they should always be kept in view in the administration ot medicines. Females usually require smaller doses than males; and persons of sanguine temperament bear depletory medicines better than the phlegmatic.

TABLES OF WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHT. (*Ed.*)

Pounds.		Ounces.		Drachms.		Scruples.		Grains.
℔ 1	=	12	=	96	=	288	=	5760
		℥ 1	=	8	=	24	=	480
				ʒ 1	=	3	=	60
						℈ 1	=	gr. 20

AVOIRDUPOIS WEIGHT.

Pounds.		Ounces.		Drachms.		Troy Grains.
℔ 1	=	16	=	256	=	7000
		℥ 1	=	16	=	437.5
				ʒ 1	=	27.3437

TABLES FOR CONVERTING APOTHECARIES' (*Troy*) WEIGHT INTO AVOIRDUPOIS WEIGHT.

APOTHECARY.		AVOIRDUPOIS.			APOTHECARY.		AVOIRDUPOIS.		
℔		℔	oz.	gr.	℔		℔	oz.	gr.
1	=	0	13	72.5	17	=	13	15	359.5
2	=	1	10	145	18	=	14	12	430
3	=	2	7	217.5	19	=	15	10	65
4	=	3	4	290	20	=	16	7	137.5
5	=	4	1	362.5	30	=	24	10	425
6	=	4	14	435	40	=	32	14	275
7	=	5	12	70	50	=	41	2	125
8	=	6	9	142.5	60	=	49	5	412.5
9	=	7	6	215	70	=	57	9	262.5
10	=	8	3	287.5	80	=	65	13	112.5
11	=	8	0	360	90	=	74	0	400
12	=	9	13	432.5	100	=	82	4	250
13	=	10	11	67.5	200	=	164	9	62.5
14	=	11	8	140	300	=	246	13	312.5
15	=	12	5	212.5	400	=	293	2	125
16	=	13	2	285	500	=	411	6	375

APOTHECARY.			AVOIRDUPOIS.	APOTHECARY.			AVOIRDUPOIS.
oz.		oz.	gr.	oz.		oz.	gr.
1	=	1	42.5	7	=	7	297.5
2	=	2	85	8	=	8	340
3	=	3	127.5	9	=	9	382.5
4	=	4	170	10	=	10	425
5	=	5	212.5	11	=	12	30
6	=	6	255	12	=	13	72.5

TABLES FOR CONVERTING AVOIRDUPOIS WEIGHT INTO APOTHECARIES' (*Troy*), WEIGHT.

AVOIRDUPOIS.		APOTHECARY.				AVOIRDUPOIS.		APOTHECARY.			
℔		℔	oz.	dr.	gr.	℔		℔	oz.	dr.	gr.
1	=	1	2	4	40	17	=	20	7	7	20
2	=	2	5	1	20	18	=	21	10	4	00
3	=	3	7	6	00	19	=	23	1	0	40
4	=	4	10	20	40	20	=	24	3	5	20
5	=	6	0	7	20	30	=	36	5	4	00
6	=	7	3	4	00	40	=	48	7	2	40
7	=	8	6	0	40	50	=	60	9	1	20
8	=	9	8	5	20	60	=	72	11	0	00
9	=	10	11	2	00	70	=	85	0	6	40
10	=	12	1	6	40	80	=	97	2	5	20
11	=	13	4	3	20	90	=	109	4	4	00
12	=	14	7	0	00	100	=	121	6	2	40
13	=	15	9	4	40	200	=	243	0	5	20
14	=	17	0	1	20	300	=	364	7	0	00
15	=	18	2	6	00	400	=	486	1	2	40
16	=	19	5	2	40	500	=	607	7	5	20

WINE MEASURE. (*Apothecaries'*)

Gall.		Pints.		Fluidoun.		Fluidr.		Scr.		Minims.		Troy grains.		Cub. inch.		Litres.
1	=	8	=	128	=	1024	=	3072	=	61440	=	58317.7980	=	231	=	3.78515
		O 1	=	16	=	128	=	384	=	7680	=	7289.7250	=	28.875	=	0.473144
				f ℥ 1	=	8	=	24	=	480	=	455.6075	=	1.8047	=	0.029571
						f ʒ 1	=	3	=	60	=	50.9500	=	0.2256	=	0.00369
								℈ 1	=	20	=	18.9840	=	0.0752	=	0.000132
										♏ 1	=	0.9492	=	0.00376	=	0.0000616

IMPERIAL MEASURES.

IMPERIAL MEASURE. (*Lond. Phar.* 1836.)

Gallon.		Pints.		Fluidounces.		Fluidrachms.		Minims.		Imp. Grains.
Cong. 1	=	8	=	160	=	1280	=	76800	=	70000
		O 1	=	20	=	160	=	9600	=	8750
				f ℥ 1	=	8	=	480	=	437.5
						f ʒ 1	=	60	=	54.7
								♏ 1	=	0.91

The Imperial gallon contains ten pounds avoirdupois' weight of distilled water, at 62° F., the barometer being at 30 inches; from which are calculated the following weights and measures:

IMPERIAL AVOIRDUPOIS WEIGHT.

			Troy Grains.		Cubic Inches of Water.
16 drachms (*dr.*)	= 1 ounce	=	437½	=	1.7329625
16 ounces (*oz.*)	= 1 pound	=	7000	=	27.7274
14 pounds (*lb.*)	= 1 stone	=	8000	=	388.1836
28 pounds (*lb.*)	= 1 quarter	=	00	=	776.3672
4 quarters (*qr.*)	= 1 hundredweight	=	00	=	3105.4688
20 hn'd w't (*cwt.*)	= 1 ton	=	00	=	62109.376

IMPERIAL MEASURES OF CAPACITY.

				Cubic Inches.			
1 gill	=		=	8.6648125	=	5	oz. of water.
4 gills	=	1 pint	=	34.65925	=	1¼	lb. “
2 pints	=	1 quart	=	69.3185	=	2½	lb. “
4 quarts	=	1 gallon	=	277.274	=	10	lb. “
2 gallons	=	1 peck	=	554.548	=	20	lb. “
4 pecks	=	1 bushel	=	2218.192	=	80	lb. “
8 bushels	=	1 quarter	=	17745.530	=	640	lb. “

The Imperial gallon is equal to 277.274 cubic inches of distilled water; or ten pounds Avoirdupois; or twelve pounds one ounce, sixteen pennyweights and sixteen grains, Troy. The Wine, or Apothecaries' gallon is equal to 231 cubic inches of distilled water; or eight pounds, five ounces, six and one-fourth drachms Avoirdupois; or, ten pounds one ounce, nine pennyweights and twenty-two grains, Troy.

TABLE FOR CONVERTING APOTHECARY OR WINE MEASURE INTO IMPERIAL.

Apothecary.		Imperial.	Apothecary.		Imperial.
1000	=	833.11	6000	=	4998.67
2000	=	1666.22	7000	=	5831.78
3000	=	2499.33	8000	=	6664.89
4000	=	3332.44	9000	=	7498.00
5000	=	4165.56	10000	=	8331.11

Suppose we desire to know how many Imperial gallons are equal to 9643 Apothecary

Apothecary.		Imperial.
9000	=	7498.00
600	=	499.867
40	=	33.3244
3	=	2.49933
9643		8033.69073

TABLE FOR CONVERTING IMPERIAL MEASURE INTO APOTHECARY.

Imperial.		Apothecary.	Imperial.		Apothecary.
1	=	1.2	10	=	12
2	=	2.4	20	=	24
3	=	3.6	30	=	36
4	=	4.8	40	=	48
5	=	6.0	50	=	60
6	=	7.2	60	=	72
7	=	8.4	70	=	84
8	=	9.6	80	=	96
9	=	10.8	90	=	108

IMPERIAL MEASURE may also be converted into Wine or Apothecary measure, by multiplying the quantity given by the decimals 1.20032; or by the fractions $\frac{6}{5}$, which will give the answer nearly; thus—

Reduce two pints Imperial measure to Wine measure:

$2 \times 1.20032 = 2.20064$ pints; or $2 \times \frac{6}{5} = 2\frac{2}{5}$ pints Wine measure, nearly.

APOTHECARY MEASURE may also be converted into Imperial measure by multiplying the quantity given, by the decimals .83311; or by the fractions $\frac{5}{6}$, which will give the answer nearly; thus—

Reduce 63 gallons Wine measure to Imperial measure:

$63 \times .83311 = 52.486$ gallons; or $63 \times \frac{5}{6} = 52\frac{1}{2}$ Imperial gallons, nearly.

FRENCH DECIMAL WEIGHTS AND MEASURES.

MEASURES AND WEIGHTS.

			English Troy Grains.		*lb.*	*oz.*	*dr.*	*gr.*
Milligramme	(1000th of a gramme)	=	.0154					
Centigramme	(100th of a gramme)	=	.1543					
Décigramme	(10th of a gramme)	=	1.5434					
Gramme	(unit of weight)	=	15.4340					
Décagramme	(10 grammes)	=	154.3402	=	0	0	2	34.34
Hectogramme	(100 grammes)	=	1543.4023	=	0	3	1	43.4
Kilogramme	(1000 grammes)	=	15434.0234	=	2	8	1	14.02
Myriagramme	(10,000 grammes)	=	154340.2344	=	26	9	4	20.23

N. B.—In the Edinburgh New Dispensatory, 1830, from which these tables are taken, the gramme is given as 15.4440 Troy grains, but upon investigation it has been found to be only 15.4340 grains, hence I have made the correction as above, and made the calculations accordingly.

Gr'me.		Troy Grains.	Deca-gramme.		Troy Dra'ms.	Troy Gr's.	Hecto-gramme.		Troy Ounces.
1	=	15.444	1	=	2	34.44	1	=	3.2175
2	=	30.888	2	=	5	8.88	2	=	6.4350
3	=	46.332	3	=	7	43.32	3	=	9.6525
4	=	61.776	4	=	10	17.76	4	=	12.8700
5	=	77.220	5	=	12	52.20	5	=	16.0875
6	=	92.664	6	=	15	20.64	6	=	19.3050
7	=	108.108	7	=	18	1.08	7	=	22.5295
8	=	123.552	8	=	20	35.52	8	=	25.7400
9	=	138.996	9	=	23	9.96	9	=	28.9575

MEASURES OF LENGTH.

The metre being at 32° *and the foot at* 62°.

			English Inches.		ml's.	fur.	yds.	ft.	in's.
Millimètre	(1000th of a mètre)	=	.03937						
Centimètre	(100th of a mètre)	=	.39371						
Decimètre	(10th of a mètre)	=	3.93710						
Mètre	(unit of length)	=	39.37100	=	0	0	1	0	3.37
Décamètre	(10 mètres)	=	393.71000	=	0	0	10	2	9.71
Hectomètre	(100 mètres)	=	3937.10000	=	0	0	109	1	1.10
Kilomètre	(1000 mètres)	=	39371.00000	=	0	4	213	1	11.00
Myriamètre	(10,000 mètres)	=	393710.00000	=	6	1	156	1	2.00

MEASURES OF CAPACITY.

			Eng. Cub. In.		Apoth'ry.	
Millitre	(1000 of a litre or cubic centimètre)	=	.06103	=	16.3	♏.
Centilitre	(100th of a litre)	=	.61028	=	2.705	fl. dr
Décilitre	(10th of a litre)	=	6.10280	=	3.381	fl. oz.
Litre	(cubic decimètre and unit of capacity)	=	61.02800	=	2.113	oct.
Décalitre	(10 litres)	=	610.28000	=	2.642	galls.
					Imperial.	
Hectolitre	(100 litres)	=	6102.80000	=	22.01	galls.
Kilolitre	(1000 litres or cubic metre)	=	61028.00000	=	27.51	bush.
Myrialitre	(10,000 litres)	=	610280.00000	=	34.39	qrs.

APOTHECARY MEASURE.

1 litre = 2.11353 pints.
2 " = 4.22706 "
3 " = 6.34059 "
4 " = 8.45412 "
5 " = 10.56765 "
6 " = 12.68118 "
7 " = 14.79471 "
8 " = 16.90824 "
9 " = 19.02177 "

APPROXIMATE MEASUREMENTS.

A teacup commonly contains about three and a half or four fluidounces of an infusion, decoction, or mixture; a wineglass commonly contains about one and a half or two fluidounces; a tablespoon about three and a half or four fluidrachms; and a teaspoon about fifty minims or one fluidrachm. But these are very uncertain methods of measuring, especially where accuracy is required.

Drops are frequently supposed to be equal to minims, but this is not the case; a drop of some fluid substances will exceed a minim, while that of others will fall considerably below it. The same fluid may vary in the size of its drops, according to the size or form of the edge of the vessel from which it is dropped. That fluids vary in the number of drops required to make a fluidrachm, will be seen by the following table by Mr. E. Durand, of Philadelphia:

	No. of drops in 20 minims.	No. of minims in 20 drops.
Acetic acid (crystallizable)	40	10
Acid hydrocyanic (aq. solution)	15	26.6
Acid muriatic	18	22.2
Acid nitric	28	14.2
Acid nitric diluted (1 to 7)	17	23.5
Acid sulphuric	30	13.3
Acid sulphuric diluted (1 to 7)	17	23.5
Alcohol, diluted	40	10
Alcohol, rectified	46	8.6
Arsenite of potassa (solution of)	19	21
Ether, sulphuric	50	8
Oil of Wormseeed, peppermint, anise, olive, cloves, sweet almonds, etc	40	10
Tincture of opium, valerian, assafœdita, guaiac, digitalis, cantharides, etc	40	10
Tincture of muriate of iron	44	9.1
Vinegar, distilled	19	21
Vinegar of colchicum, of opium (black drop) of squill	26	15.3
Water, distilled	15	26.6
Water of ammonia (strong)	18	22.2
Water of ammonia (weak)	15	26.6
Wine, Teneriffe	26	15.3
Wine, antimonial	24	16.6
Wine of colchicum	25	16
Wine of opium	26	15.3

—*Jour. Phil. Coll. Pharm. I. p*, 169.

TABLES OF SPECIFIC GRAVITIES, ETC.

Relation between Specific Gravities, and Degrees of Baumé's Hydrometer for Liquids heavier than Water.

Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.
1.000 =	0	1.152 =	19	1.359 =	38	1.656 =	57
1.007	1	1.161	20	1.372	39	1.676	58
1.014	2	1.171	21	1.384	40	1.695	59
1.022	3	1.180	22	1.398	41	1.714	60
1.029	4	1.190	23	1.412	42	1.736	61
1.036	5	1.199	24	1.426	43	1.758	62
1.044	6	1.210	25	1.440	44	1.779	63
1.052	7	1.221	26	1.454	45	1.801	64
1.060	8	1.231	27	1.470	46	1.823	65
1.067	9	1.242	28	1.485	47	1.847	66
1.075	10	1.252	29	1.501	48	1.872	67
1.083	11	1.264	30	1.526	49	1.897	68
1.091	12	1.275	31	1.532	50	1.921	69
1.100	13	1.286	32	1.549	51	1.946	70
1.108	14	1.298	33	1.566	52	1.974	71
1.116	15	1.309	34	1.583	53	2.002	72
1.125	16	1.321	35	1.601	54	2.031	73
1.134	17	1.334	36	1.618	55	2.059	74
1.143	18	1.346	37	1.637	56	2.087	75

Relation between Specific Gravities, and Degrees of Baumé's Hydrometer for Liquids lighter than Water.

Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.	Sp. Gr.	Baumé.
1.000 =	10	0.918 =	23	0.849 =	36	0.789 =	49
0.993	11	0.913	24	0.844	37	0.785	50
0.986	12	0.907	25	0.839	38	0.781	51
0.980	13	0.901	26	0.834	39	0.777	52
0.973	14	0.896	27	0.830	40	0.773	53
0.967	15	0.890	28	0.825	41	0.768	54
0.960	16	0.885	29	0.820	42	0.764	55
0.954	17	0.880	30	0.816	43	0.760	56
0.948	18	0.874	31	0.811	44	0.757	57
0.942	19	0.869	32	0.807	45	0.753	58
0.936	20	0.864	33	0.802	46	0.749	59
0.930	21	0.859	34	0.798	47	0.745	60
0.924	22	0.854	35	0.794	48		

HYDROMETRICAL EQUIVALENTS.

Sp. Gr. at 60° Fah.	100 parts contain of		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796.	Water.					
	By Weight.						
796	100	0			46.5	43.48	100
797	99.5	.5					99.75
798	99	1			46	43.06	99.50
799	98.67	1.33					99.25
800	98.33	1.67					99
801	98	2					98.75
802	97.67	2.33			45	42.14	98.50
803	97.33	2.67				42	98.28
804	97	3					98.15
805	96.67	3.33					98
806	96.33	3.67					97.80
806.5	96.17	3.83			44	41.21	97.70
807	96	4					97.60
808	95.5	4.5				41	97.40
809	95	5					97.29
809.5	94.89	5.10					97.10
810	94.67	5.33					97
811	94.33	5.67			43	40.34	96.75
812	94	6					96.50
813	93.67	6.33				40	96.25
814	93.33	6.67					96
815	93	7					95.75
816	92.5	7.5			42	39.40	95.50
817	92	8					95.25
818	91.67	8.33					95
818.6	91.5	8.5				39	94.90
819	91.33	8.67					94.75
820	91	9					94.50
821	90.5	9.5			41	38.46	94.25
822	90	10					94
823	89.67	10.33				38	93.75
824	89.33	10.67					93.50
825	89	11	1000	63 O. P.	40	37.55	93.25
826	88.5	11.5	993	62			93
827	88	12	988.5	61.5		37	92.6
828	87.67	12.33	984	61	39.5		92.3
829	87.33	12.67	979.5	60.5	39	36.63	92
830	87	13	975	60			91.7
831	86.5	13.5	970.5	59.5	38.5	36.17	91.35
832	86	14	966	59		36	91
833	85.67	14.33	961.5	58.3			90.65
834	85.33	14.67	957	58	38	35.72	90.3
835	85	15	953	57.5			90
836	84.67	15.33	949	57	37.5	35.26	89.7
837	84.33	15.67	944.5	56.5			89.35
837.6	84.25	15.75	942.5	56.3		35	89.20

Sp. Gr. at 60° Fah.	100 parts contain of		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796. By Weight.	Water.					
838	84	16	940	56 O. P.			89
839	83.5	16.5	936	55.5	37	34.80	88.75
840	83	17	932	55			88.5
841	82.67	17.33	928	54.5	36.5		88.25
842	82.33	17.67	924	54		34.94	88
843	82	18	920	53.5		34	87.65
844	81.67	18.33	916	53	36	33.88	87.3
845	81.33	18.67	912	52.5			87
846	81	19	908	52			86.7
847	80.5	19.5	903	51	36.5	33.42	86.35
848	80	20	898	50			86
849	79.67	20.33	893	49.5			85.65
850	79.33	20.67	888	49	35	33	85.3
851	79	21	883	48.5			85
852	78.5	21.5	878	48	34.5	32.43	84.7
853	78	22	873	47.5			84.35
854	77.5	22.5	868	47			84
855	77	23	862.5	46.5	34	32.04	83.65
856	76.5	23.5	857	46			83.3
857	76	24	853	45.5	33.5	31.58	83
858	75.67	24.33	849	45			82.7
859	75.33	24.67	844.5	45			82.35
860	75	25	840	45	33	31.13	82
861	74.67	25.33	836.5	44.5		31	81.7
862	74.33	25.67	833	44			81.3
862.5	74.16	25.84	830.5	43.75	32.5	30.76	81
863	74	26	828	43.5			80.8
864	73.5	26.5	823	43			80.3
865	73	27	818	42.5	32	30.21	79.95
866	72.5	27.5	813	42			79.6
867	72	28	810	41			79.3
867.5	71.83	28.17	808.5	40.5	31.5	29.78	79.15
868	71.67	28.33	807	40			79
869	71.33	28.67	802.5	39.5			78.65
870	71	29	798	39	31	29.29	78.3
871	70.5	29.5	792.5	38.5			78
872	70	30	787	38		29	77.7
873	69.5	30.5	781.5	37	30.5	28.83	77.35
874	69	31	776	36			77
875	68.67	31.33	772	35			76.5
876	68.33	31.67	768	34	30	28.38	76
877	68	32	762.5	33			75.65
877.5	67.75	32.25	759.25	32.5		28	75.5
878	67.5	32.5	757	32			75.3
878.5	67.25	32.75	753.75	31.5	29.5	27.91	75
879	67	33	751.5	31			74.8
880	66.5	33.5	746	30			74.3
881	66	34	742	29.5	29	27.44	74

Sp. Gr. at 60° Fah.	100 parts contain of By Weight.		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796.	Water.					
882	65.5	34.5	738	29 O. P.			73.7
883	65	35	733.5	28.5		27	73.35
883.5	64.83	35.17	731.25	28.25	28.5	26.99	73.17
884	64.67	35.33	729	28			73
885	64.33	35.67	724	27.5			72.5
886	64	36	719	27	28	26.53	72
887	63.67	36.33	714	26			71.5
888	63.33	36.67	709	25			71
889	63	37	704	24.5	27.5	26.07	70.65
890	62.5	37.5	699	24			70.3
891	62	38	694	23			69.8
892	61.5	38.5	689	22	27	25.61	69.3
893	61	39	644.5	21			69
894	60.67	39.33	680	20			68.7
895	60.33	39.67	675.5	19.5			68.35
895.5	60.16	39.84	673.25	19.25	26.5	25.15	68.17
896	60	40	671	19		25	68
897	59.5	40.5	666.5	18			67.65
898	59	41	662	17	26	24.69	67.3
899	58.5	41.5	655.5	16			67
900	58	42	649	15			66.7
900.5	57.75	42.25	647	14.75	25.5	24.23	66.52
901	57.5	42.5	645	14.5			66.35
901.5	57.25	42.75	643	14.25		24	66.17
902	57	43	641	14			66
903	56.5	43.5	636	13	25	23.77	65.5
904	56	44	631	12			65
905	55.5	44.5	626	11.5			64.5
906	55	45	621	11	24.5	23.31	64
907	54.5	45.5	616.5	10.5			63.65
908	54	46	612	10		23	63.3
909	53.5	46.5	607	9	24	22.85	62.65
910	53	47	602	8			62.3
911	52.5	47.5	595.5	7.5			61.9
912	52	48	591	7	23.5	22.39	61.5
913	51.67	48.33	586	6			61
914	51.33	48.67	581	5			60.5
915	51.5	49	576	4	23	21.94	60
916	50.5	49.5	571	3			59.6
917	50	50	560.5	2			59.3
918	49.67	50.33	562	1	22.5	21.48	59
919	49.33	50.67	554	.5			58.5
920	49	51	550	Proof			58
921	48.5	51.5	545	1 U. P.	22	21.02	57.5
922	48	52	540	2			57
923	47.5	52.5	535.5	3	21.5	20.56	56.5
924	47	53	531	4			56
925	46.5	53.5	526	5			55.5

Sp. Gr. at 60° Fah.	100 parts contain of By Weight.		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé.	Cartier.	Per Cent. of Alcohol, Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796.	Water.					
926	46	54	521	6 U. P.	21	20.10	55
927	45.5	54.5	515.5	6.5			54.5
928	45	55	510	7			54
929	44.5	55.5	505	8			53.5
929.5	44.25	55.75	502.5	8.5	20.5	19.64	53.25
930	44	56	500	9			53
931	43.67	56.33	495.5	10			52.5
932	43.33	56.67	489	11			52
933	43	57	484	12	20	19.18	51.5
934	42.5	57.5	479	13		19	51
935	42	58	472.5	14			50.5
936	41.5	58.5	468	15	19.5	18.72	50
937	41	59	462	16			49.5
938	40.5	59.5	456	17			49
939	40	60	450	18	19	18.26	48.5
940	39.5	60.5	444	19			48
940.5	39.25	60.75	441	19.5		18	47.63
941	39	61	438	20			47.25
942	38.5	61.5	432	21	18.5	17.80	46.5
943	38	62	426.5	22			45.5
944	37.5	62.5	421	23			45
945	37	63	416	23.5	18	17.35	44.75
946	36.5	63.5	411	24			44
947	36	64	399	25		17	43.5
948	35.5	64.5	397	26	17.5	16.89	43
949	35	65	389.5	27			42.25
950	34.5	65.5	382	28			41.5
951	34	66	376	29.5	17	16.43	40
952	33.5	66.5	370	31			40.5
953	33	67	364	32.5			39.75
954	32.5	67.5	358	34			39
955	32	68	352	35	16.5	16.3	38.5
956	31.5	68.5	346	36		16	38
957	31	69	339.5	37.5			37.25
958	30	70	333	39			36.5
959	29.5	70.5	324	40.5	16	15.51	35.75
960	29	71	315	42			35
961	28.5	71.5	307.5	43.5			34.5
962	28	72	300	45	15.5	15	34
963	27	73	292.5	46.5			33
964	26.5	73.5	285	48			32
965	26	74	277.5	49.5	15	14.59	31
966	25.5	74.5	270	51			30
967	25	75	261.5	52.5			29
968	24	76	253	54			28
968.5	23.75	76.25			14.5	14.13	27.5
969	23.5	76.5	244.5	55.5			27
970	23	77	236	57			26

Sp. Gr. at 60° Fah.	100 parts contain of By Weight.		1000 parts contain of Standard Alc. Sp. Gr. 825.	Sikes.	Baumé	Cartier.	Per cent. of Alcohol. Sp. Gr. 796 by volume. Gay Lussac.
	Alcohol Sp. Gr. 796	Water.					
971	22.5	77.5	227	58.5U.P.			25
972	22	78	218	60	14	13.67	24
973	21	79	209	62			23
974	20	80	200	64			22
975	19	81	195	66	13.5	13.21	21
976	18.5	81.5	190.5	68			20
977	18	82	183.5	70			19
978	17	83	175	72	13	12.76	18
979	16	84	163	73.5			17
980	15.5	84.5	150	75			16
981	15	85	143	76			15
982	14	86	135	77	12.5	12.30	14
983	13.5	86.5	128	78.5			13
984	13	87	120	80			12
985	12.5	87.5	112	81			11.25
986	12	88	105	82	12	11.84	10.5
987	11	89	98	83.5			9.75
988	10	90	90	85			9
989	9	91	82	87	11.5	11.38	8
990	8	92	75	89			7
991	7	93	67.5	90.5			6.5
992	6	94	60	92			6
993	5.5	94.5	52.5	93.5	11	10.92	5
994	5	95	45	95			4
995	4	96	37.5	95.5			3.5
996	3.5	96.5	30	96	10.5	10.46	3
997	3	97	22.5	97			2
998	2	98	15	98			1
999	1	99	7.5	99			.5
1000	0	100	0	100	10	10	0

Table of the Quantity of Liquid Muriatic Acid of sp. gr. 1.2, *of Muriatic Acid Gas, and of Chlorine, in* 100 *parts of Liquid Acid of different densities.*

Sp. Gr.	Liquid Acid of Sp. gr. 1.2.	Acid Gas.	Chlorine.	Sp. Gr.	Liquid Acid of Sp. gr. 1.2.	Acid Gas.	Chlorine.
1.2000	100	40.777	39.675	1.1102	55	21.822	22.426
1.1910	95	38.738	37.692	1.1000	50	20.388	19.837
1.1822	90	36.700	35.707	1.0899	45	88.348	17.854
1.1721	85	34.660	33.724	1.0798	40	16.310	15.870
1.1701	84	34.252	33.328	1.0697	35	14.271	13.887
1.1620	80	32.621	31.746	1.0597	30	12.233	11.903
1.1599	79	32.213	31.343	1.0497	25	10.194	9.919
1.1515	75	30.582	29.757	1.0397	20	8.155	7.935
1.1410	70	28.544	27.772	1.0298	15	6.116	5.951
1.1308	65	26.504	25.789	1.0200	10	4.078	3.968
1.1206	60	24.466	23.805	1.0100	5	2.039	1.984

Quantities of Anhydrous and of Liquid Sulphuric Acid contained in Mixtures of Oil of Vitriol and Water at different Densities. (Ure.)

Specific Gravity.	Liq. Acid Sp. Gr. 1.8485 in 100.	Dry Acid in 100	Specific Gravity.	Liq. Acid in 100.	Dry Acid in 100.
1.8485	100	81.54	1.3884	50	40.77
1.8475	99	80.72	1.3788	49	39.95
1.8460	98	79.90	1.3697	48	39.14
1.8439	97	79.09	1.3612	47	38.32
1.8410	96	78.28	1.3530	46	37.51
1.8376	95	77.46	1.3440	45	36.69
1.8336	94	76.65	1.3345	44	35.88
1.8290	93	75.83	1.3255	43	35.06
1.8233	92	75.02	1.3165	42	34.25
1.8179	91	74.20	1.3080	41	33.43
1.8115	90	73.39	1.2999	40	32.61
1.8043	89	72.57	1.2913	39	31.80
1.7962	88	71.75	1.2826	38	30.98
1.7870	87	70.94	1.2740	37	30.17
1.7774	86	70.12	1.2654	36	29.35
1.7673	85	69.31	1.2572	35	28.54
1.7570	84	68.49	1.2490	34	27.72
1.7465	83	67.68	1.2409	33	26.91
1.7360	82	66.86	1.2334	32	26.09
1.7245	81	66.05	1.2260	31	25.28
1.7100	80	65.23	1.2184	30	24.46
1.6993	79	64.42	1.2108	29	23.65
1.6870	78	63.60	1.2032	28	22.83
1.6750	77	62.78	1.1956	27	22.01
1.6630	76	61.97	1.1876	26	21.20
1.6520	75	61.15	1.1792	25	20.38
1.6415	74	60.34	1.1706	24	19.57
1.6321	73	59.52	1.1626	23	18.75
1.6204	72	58.71	1.1549	22	17.94
1.6090	71	57.89	1.1480	21	17.12
1.5975	70	57.08	1.1410	20	16.31
1.5868	69	56.26	1.1330	19	15.49
1.5760	68	55.45	1.1246	18	14.68
1.5648	67	54.63	1.1165	17	13.86
1.5503	66	53.82	1.1090	16	13.05
1.5390	65	53.00	1.1019	15	12.23
1.5280	64	52.18	1.0953	14	11.41
1.5170	63	51.37	1.0887	13	10.60
1.5066	62	50.55	1.0809	12	9.78
1.4960	61	49.74	1.0743	11	8.97
1.4860	60	48.92	1.0682	10	8.15
1.4760	59	48.11	1.0614	9	7.34
1.4660	58	47.29	1.0544	8	6.52
1.4560	57	46.48	1.0477	7	5.71
1.4460	56	45.66	1.0405	6	4.89
1.4360	55	44.85	1.0336	5	4.08
1.4265	54	44.03	1.0268	4	3.26
1.4170	53	43.22	1.0206	3	2.446
1.4073	52	42.40	1.0140	2	1.63
1.3977	51	41.58	1.0074	1	0.8154

Quantities of Anhydrous and of Liquid Nitric Acid contained in Mixtures of Nitric Acid and Water at different Densities. (Ure.)

Specific Gravity.	Liq. Acid Sp. Gr. 1.5 in 100.	Dry Acid in 100.	Specific Gravity.	Liq. Acid in 100.	Dry Acid in 100.
1.5000	100	79.700	1.2947	50	39.850
1.4980	99	78.903	1.2887	49	39.053
1.4960	98	78.106	1.2826	48	38.256
1.4940	97	77.309	1.2765	47	37.459
1.4910	96	76.512	1.2705	46	36.662
1.4880	95	75.715	1.2644	45	35.865
1.4850	94	74.918	1.2583	44	35.068
1.4820	93	74.121	1.2523	43	34.271
1.4790	92	73.324	1.2462	42	33.474
1.4760	91	72.527	1.2402	41	32.677
1.4730	90	71.730	1.2341	40	31.880
1.4700	89	70.933	1.2277	39	31.083
1.4670	88	70.136	1.2212	38	30.286
1.4640	87	69.339	1.2148	37	29.489
1.4600	86	68.542	1.2084	36	28.692
1.4570	85	67.745	1.2019	35	27.895
1.4530	84	66.948	1.1958	34	27.098
1.4500	83	66.135	1.1895	33	26.301
1.4460	82	65.354	1.1833	32	25.504
1.4424	81	64.557	1.1770	31	24.707
1.4385	80	63.760	1.1709	30	23.900
1.4346	79	62.963	1.1648	29	23.113
1.4306	78	62.166	1.1587	28	22.316
1.4269	77	61.369	1.1426	27	21.519
1.4228	76	60.572	1.1465	26	20.722
1.4189	75	59.775	1.1403	25	19.925
1.4147	74	58.978	1.1345	24	19.128
1.4107	73	58.181	1.1286	23	18.331
1.4065	72	57.384	1.1227	22	17.534
1.4023	71	56.587	1.1168	21	16.737
1.3978	70	55.790	1.1109	20	15.940
1.3945	69	54.993	1.1051	19	15.143
1.3882	68	54.196	1.0993	18	14.346
1.3833	67	53.399	1.0935	17	13.549
1.3783	66	52.602	1.0878	16	12.752
1.3732	65	51.805	1.0821	15	11.955
1.3681	64	51.068	1.0764	14	11.158
1.3630	63	50.211	1.0708	13	10.361
1.3579	62	49.414	1.0651	12	9.564
1.3529	61	48.617	1.0595	11	8.767
1.3477	60	47.820	1.0540	10	7.970
1.3427	59	47.023	1.0485	9	7.173
1.3376	58	46.226	1.0430	8	6.376
1.3323	57	45.429	1.0375	7	5.579
1.3270	56	44.632	1.0320	6	4.782
1.3216	55	43.835	1.0267	5	3.985
1.3163	54	43.038	1.0212	4	3.188
1.3110	53	42.241	1.0159	3	2.391
1.3056	52	41.444	1.0106	2	1.594
1.3001	51	40.647	1.0053	1	0.797

Value and Atomic Composition of Hydrochloric Acid at Different Densities.

DAVY.		THOMSON.		
(Temp. 40° Bar. 30.) Specific Gravity.	100 grains contain of Hydroc. Acid Gas.	Specific Gravity.	Real Acid in 100 of Liquid.	Atoms of Water to 1 of Acid.
1.21	42.43	1.203	40.66	6
1.20	40.80	1.179	37.00	7
1.19	38.38	1.162	33.95	8
1.18	36.36	1.149	31.35	9
1.17	34.34	1.139	29.13	10
1.16	32.32	1.128	27.21	11
1.15	30.30	1.119	25.52	12
1.14	28.28	1.112	24.03	13
1.13	26.26	1.106	22.70	14
1.12	24.24	1.100	21.51	15
1.11	22.30	1.096	20.44	16
1.10	20.20	1.090	19.47	17
1.09	18.18	1.086	18.59	18
1.08	16.16	1.082	17.79	19
1.07	14.14	1.087	17.05	20
1.06	12.12			
1.05	10.10			
1.04	8.08			
1.03	6.06			
1.02	4.04			
1.01	2.02			

Specific Gravity of Acetic Acid at different degrees of Dilution.

THOMSON.

Atoms of Acid.		Atoms of Water.		Specific Gravity at 60°.
1	+	1	=	1.06296
1	+	2	=	1.07060
1	+	3	=	1.07084
1	+	4	=	1.07132
1	+	5	=	1.06820
1	+	6	=	1.06708
1	+	7	=	1.06349
1	+	8	=	1.05974
1	+	9	=	1.05794
1	+	10	=	1.05439

Quantities of Ammonia in Solutions of different Specific Gravities.

DAVY.

100 parts Specific Gravity,		of Ammonia.
8750	contain	32.50
8875	“	29.25
9000	“	26.00
9054	“	25.37
9166	“	22.07
9255	“	19.54
9326	“	17.52
9385	“	15.88
9435	“	14.53
9476	“	13.46
9513	“	12.40
9545	“	11.56
9573	“	10.82
9597	“	10.17
9619	“	9.60
9612	“	9.50

Strengths of Solutions of Ammonia of different Specific Gravities, and their respective boiling points.

DALTON.

Specific Gravity.	Grs. of Ammonia in 100 grs. of liquid.	Boiling Point.	Vol. of Gas in one vol. of liquid.
850	35.3	26	494
860	32.6	38	456
870	29.9	50	419
880	27.3	62	382
890	24.7	74	346
900	22.2	86	311
910	19.8	98	277
920	17.4	100	244
930	15.1	122	211
940	12.8	134	180
950	10.5	146	147
960	8.3	158	116
970	6.2	173	87
980	4.1	187	57
990	2.0	196	28

Quantity of Anhydrous Potassa contained in Solutions of different Specific Gravities.

DALTON.

Specific Gravity.	Potassa Per cent.	Boiling point.
1.68	51.2	329°
1.60	46.7	290
1.52	42.9	276
1.47	39.6	265
1.44	36.8	255
1.42	34.4	246
1.39	32.4	240
1.36	29.4	234
1.33	26.3	229
1.28	23.4	224
1.23	19.5	220
1.19	16.2	218
1.15	13.0	215
1.11	9.5	214
1.06	4.7	213

Quantities of Anhydrous Soda contained in Solutions of different Specific Gravities.

DALTON.

Specific Gravity.	Dry Soda per cent.	Boiling Point.
1.85	63.6	600°
1.72	53.8	400
1.63	46.6	300
1.56	41.2	280
1.50	36.8	265
1.47	34.0	255
1.44	31.0	248
1.40	29.0	242
1.36	26.0	235
1.32	23.0	228
1.29	19.0	224
1.23	16.0	230
1.18	13.0	217
1.12	9.0	214
1.06	4.7	213

SPECIFIC GRAVITIES OF SOME OF THE PREPARATIONS ORDERED IN THE PHARMACOPŒIAS.

The London Pharmacopœia directs the Specific Gravity to be taken at a temperature of 62° Fahr. The Edinburgh, Dublin and U. S. Pharmacopœias, at 60° Fahr.

		Sp. Gr.
Acetum Destillatum	Edin.	1.005
————————	Dublin	1.005
Acidum Aceticum	London	1.048
————————	U. S. Edin.	1.063 to 1.068
————————	Dublin	1.074
———————— Dilutum	Dublin	1.005
———— Hydrochloricum	London, U. S.	1.160
————————	Edin.	1.170
————————	Dublin	1.160
——————Dilutum	Edin.	1.050
————————	U. S.	1.046
————————	Dublin	1.080
————Hydrocyanicum	Dublin	998
————Nitricum	London, U. S.	1.500
————————	Edin.	1.500
———————— Dilutum	London U. S.	1.080
————————	Edin.	1.077
————————	Dublin	1.280
———— Phosphoricum Dilutum	London	1.064
———— Sulphuricum	London, U. S.	1.845
————————	Edin.	1.845
————————	Dublin	1.845
———— Sulphuricum venale	Dublin	1.850
———— Sulphuricum Dilutum	London	1.110
————————	Edin. U. S.	1.090
————————	Dublin	1.084
Æther Nitrosus	Dublin	0.900
——— Sulphuricus	London, U. S.	0.750
————————	Edin.	0.735
————————	Dublin	0.766
Alcohol	London	0.815
———	U. S.	0.835
———	Edin.	0.796
———	Dublin	0.810
——— Dilutum	U. S.	0.935
Aqua Destillata	L. E. D.	1.000
—— Ammoniæ	Edin.	0.960
——————	Dublin	0.950
—————— Acetatis	Edin.	1.011
————————	Dublin	1.011
—— Ammoniæ Carbonatis	Dublin	1.090
—— Barytæ Muriatis	Dublin	1.230
—— Calcis Muriatis	Dublin	1.202
—— Potassæ	Edin.	1.072
——————	Dublin	1.080
—————— Carbonatis	Dublin	1.320
—— Potassii Sulphureti	Dublin	1.117
—— Sodæ Carbonatis	Dublin	1.024

		Sp. Gr.
Liquor Ammoniæ	London	0.960
——————— Fortior	London, U. S.	0.882
——— Plumbi Diacetatis	London	1.260
——— Potassæ	London	1.063
—————— Carbonatis	London	1.473
Oleum Æthereum	London	1.05
—————————	U. S.	1.096
Spiritus Æthereus Nitrosus	Dublin	0.850
——— Ætheris Nitrici	London, U. S.	0.834
—————————	Edin.	0.847
——————— Sulphurici	Edin.	0.809
——— Ammoniæ	London	0.860
—————————	U. S.	0.831
——————— Aromaticus	London	0.914
——————— Fœtidus	London	0.861
——— Rectificatus	London	0.838
—————————	Edin.	0.838
—————————	Dublin	0.840
——— Tenuior	London	0.920
—————————	Edin.	0.912
—————————	Dublin	0.919
Tinctura Ferri Sesquichloridi	London	0.992

FORMULÆ FOR COOLING OR FREEZING MIXTURES.

(MR. WALKER.)

FRIGORIFIC MIXTURES, WITHOUT ICE.

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Muriate of Ammonia,	5	From + 50° to + 10°	= 40
Nitrate of Potassa,	5		
Water,	16		
Muriate of Ammonia,	5	From + 50° to + 4°	= 46
Nitrate of Potassa,	5		
Sulphate of Soda,	8		
Water,	16		
Nitrate of Ammonia,	1	From + 50° to + 4°	= 46
Water,	1		
Nitrate of Ammonia,	1	From + 50° to — 7°	= 57
Carbonate of Soda,	1		
Water,	1		
Sulphate of Soda,	3	From + 50° to — 30°	= 80
Diluted Nitric Acid,	2		
Sulphate of Soda,	6	From + 50° to — 10°	= 60
Nitrate of Ammonia,	4		
Nitrate of Potassa,	2		
Diluted Nitric Acid,	4		

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Sulphate of Soda,	6	From + 50° to — 14°	64
Nitrate of Ammonia,	5		
Diluted Nitric Acid,	4		
Phosphate of Soda,	9	From + 50° to — 12°	62
Diluted Nitric Acid,	4		
Phosphate of Soda,	9	From + 50° to — 21°	71
Nitrate of Ammonia,	6		
Diluted Nitric Acid,	4		
Sulphate of Soda,	8	From + 50° to — 3°	53
Muriatic Acid,	5		
Sulphate of Soda,		From + 50° to — 3°	53
Sulphuric Acid,			

FRIGORIFIC MIXTURES, WITH ICE.

Snow or pounded Ice,	2	From any temperature.	to — 5°	
Salt,	1			
Snow or pounded Ice,			to — 12°	
Common Salt,	2			
Muriate of Ammonia,	1			
Snow or pounded Ice,	24		to — 18°	
Common Salt,	10			
Muriate of Ammonia,	5			
Nitrate of Potassa,	5			
Snow or pounded Ice,	12		to — 25°	
Common Salt,	5			
Nitrate of Ammonia,	5			
Snow,	3	From + 32°	to — 23°	55
Diluted Sulphuric Acid,	2			
Snow,	8	From + 32°	to — 27°	59
Muriatic Acid,	5			
Snow,	7	From + 32°	to — 30°	62
Diluted Nitric Acid,	4			
Snow,	4	From + 32°	to — 40°	72
Chloride of Calcium,	5			
Snow,	2	From + 32°	to — 50°	82
Cryst. Chloride of Calcium,	3			
Snow,	3	From + 32°	to — 51°	84
Potassa,	4			

COMBINATION OF FRIGORIFIC MIXTURES.

Mixtures.	Parts.	Thermometer sinks.	Degree of cold produced.
Phosphate of Soda, ...	5	From 0° to — 34°	= 34
Nitrate of Ammonia, ...	3		
Diluted Nitric Acid, ...	4		
Phosphate of Soda, ...	3	From — 34° to — 50°	= 16
Nitrate of Ammonia, ...	2		
Diluted Mixed Acids, ...	4		
Snow, ...	8	From 10° to — 56°	= 46
Diluted Sulphuric or Nitric Acid, .	3		
Snow, ...	3	From — 0° to — 46°	= 46
Diluted Nitric Acid, ...	2		
Snow, ...	1	From — 20° to — 60°	= 40
Diluted Sulphuric Acid, . . .	1		
Snow, ...	3	From + 20° to — 48°	= 68
Chloride of Calcium, ...	4		
Snow, ...	3	From + 10° to — 54°	= 64
Chloride of Calcium, ...	4		
Snow, ...	2	From + 15° to — 68°	= 33
Chloride of Calcium, ...	3		
Snow, ...	1	From 0° to — 66°	= 66
Cryst. Chloride of Calcium, . . .	2		
Snow, ...	1	From — 40° to — 73°	= 33
Cryst. Chloride of Calcium, . . .	3		
Snow, ...	1	From — 68° to — 91°	= 23
Diluted Sulphuric Acid, ...	10		

EFFECTS OF TEMPERATURE.

	Degrees below Zero.
Greatest artificial cold produced by the evaporation of a mixture of solid carbonic acid and ether, *in vacuo*, by Faraday, ...	160
Ditto, in the open air, by Thilorier, ...	135
Solid compound of alcohol and carbonic acid fuses, ...	131
Greatest artificial cold produced by Walker, ...	91
Strongest nitric acid freezes, ...	55
Sulphuric ether congeals, ...	47
Liquid Ammonia freezes, ...	46
Mercury freezes, ...	39
Proof spirit and brandy freeze, ...	7

	Degrees above Zero.
Solution of 1 salt in 3 water, freezes,	4
Solution of 1 salt in 4 water, freezes,	7
Mixture of 1 alcohol 3 water, freezes,	7
Solution of salammoniac in 4 water,	8
Oil of turpentine freezes,	16
Strong wines freeze,	20
Fluoric acid freezes,	23
Oils of bergamot and cinnamon,	23
Vinegar freezes,	28
Milk freezes,	30
Ice melts,	32
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Glacial acetic acid solidifies,	36
Medium temperature of the surface of the globe,	50
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Oil of aniseed freezes,	64
Lard melts,	from 90 to 97
Heat of human blood,	98
Phosphorus melts,	99
Stearine from hogs' lard melts,	109
Spermaceti melts,	112
Tallow melts, (Thomson,)	92
———— (Nicholson,)	127
Bees' wax melts,	142
Ambergris melts, (La Grange,)	145
Potassium melts, (Fownes,)	150
———— (Daniell,)	136
Bleached wax melts, (Nicholson,)	155
Sodium perfectly fluid,	200
Iodine fuses, (Gay Lussac,)	210
———— (Fownes,)	225
Sulphur fuses,	226
Camphor fuses,	303
Tin fuses,	442
Bismuth fuses,	476
Lead fuses,	594
Zinc fuses,	700
Antimony fuses,	809
Red heat, (Daniell,)	980
Heat of common fire, (Daniell,)	1140
Brass fuses, (Daniell,)	1869
Silver fuses, (Daniell,)	2233
Iron fuses,	3479

TEMPERATURES AT WHICH CERTAIN SOLIDS AND LIQUIDS ARE VOLATILIZED.

Liquid sulphurous acid boils, (*anhydrous,*)	14
Ether boils,	98
Fuming sulphurous acid boils, (*solution,*)	113

	Degrees above Zero.
Bisulphuret of carbon boils,	126
Liquid ammonia boils,	140
Pyroligneous spirit boils,	150
Alcohol boils,	176
———— (Black,)	174
———— sp. gr. 0.800, (Henry,)	172
Water boils,	212
Phosphorus distils, (Pelletier,)	219
Water saturated with sea salt boils,	225
Nitric acid boils, (sp. gr. 1. 5,)	187
White oxide of arsenic sublimes,	283
Oil of turpentine boils, (Ure,)	304
Petroleum boils, (Ure,)	316
Metallic arsenic sublimes,	540
Phosphorus boils in close vessels.	554
Sulphur boils,	570
Sulphuric acid boils, (Dalton,)	590
———— (Black,)	546
———— (Fownes,)	620
Linseed oil boils,	600
Mercury boils,	662

BOILING POINTS OF SATURATED SOLUTIONS.

	Degr.
Alum,	220
Muriate of ammonia,	236
Oxalate of ammonia,	218
Tartrate of ammonia,	230
Chloride of barium,	222
Nitrate of baryta,	214
Acetate of copper,	214
Sulphate of copper,	216
Acetate of lead,	212
Chloride of calcium,	220
Bichloride of mercury,	214
Bicyanide of mercury,	214
Sulphate of nickel,	235
Chlorate of potass,	218
Nitrate of potass,	238
Quadroxalate of potass,	220
Acetate of soda,	256
Nitrate of soda,	246
Biborate of soda,	222
Carbonate of soda,	220
Phosphate of soda,	222
Nitrate of strontia,	224
Sulphate of zinc,	220
Boracic acid,	218

TEMPERATURES TO BE OBSERVED IN CERTAIN PHARMACEUTICAL OPERATIONS.

In the fermentation of saccharine solutions, the highest temperature should not exceed 86°. (Thomson.)

The lowest temperature at which they will ferment is 38°. (Thomson.)

The process of acetous fermentation is best conducted at a temperature of above 86°.

The temperature requisite to coagulate albumen varies with the state of dilution. If the quantity of albumen be so great that the liquid has a slimy aspect, a heat of 145° to 150° suffices, but in a very dilute condition, boiling is required. (Fownes.)

In the London and U. S. Pharmacopœias:

When a boiling heat is directed, a temperature is meant of 212°, F.

When a gentle heat is directed, a temperature is meant of from 90° to 100°.

The specific gravities of substances ordered in the London Pharmacopœia, are to be taken at a temperature of 62°.

A water-bath is that by which any substance, contained in a proper vessel, is exposed either to hot water, or the vapor of boiling water. A sand-bath is made of sand, to be gradually heated, in which anything is placed contained in a proper vessel.

Syrups are to be kept in a place where the temperature never exceeds 55°.

Vegetables, shortly after they have been gathered, those excepted which ought to be fresh, are to be lightly strewed, and dried as quickly as possible, with a gentle heat (90° to 100°); keep them afterward in proper vessels, excluded from the access of light and moisture.

In the Dublin Pharmacopœia:

By the term superior heat, is meant some degree between 200° and 212°.

When a medium heat is directed, a temperature is meant between 100° and 200°.

When an inferior heat is directed, a temperature is meant between 90° and 100°.

In the process of digestion, an inferior heat is to be applied, unless it should be otherwise directed. In the process of maceration, a heat should be applied between 60° and 90°.

In the Dublin, Edinburgh, and U. S. Pharmacopœias:

Whenever mention occurs of the specific gravity of any body, its temperature is supposed to be at 60°.

CHEMICAL ELEMENTS, WITH THEIR SYMBOLS AND EQUIVALENTS.

	Symbol.	Equivalent.
Aluminium,	Al.	Phillips, 10 Graham, 13.72
Antimony, (Stibium,)	Sb.	Phillips, 65 Graham, 129.24
Arsenic,	As.	Phillips, 38 Graham, 75.34
Barium,	Ba.	68
Bismuth,	Bi.	72
Boron,	B.	Phillips, 20 Graham, 10.91
Bromine,	Br.	78
Cadmium,	Cd.	56
Calcium,	Ca.	20
Carbon,	C.	6
Cerium,	Ce.	48
Chlorine,	Cl.	36
Chromium,	Cr.	28
Cobalt,	Co.	30
Columbium, } Tantalum, }	Ta.	185
Copper, (Cuprum,)	Cu.	32
Fluorine,	F.	18
Glucinium,	G.	Phillips, 18 Graham, 26.54
Gold, (Aurum,)	Au.	200
Hydrogen,	H.	1
Iodine	I.	126
Iridium,	Ir.	98
Iron, (Ferrum,)	Fe.	28
Latanium,	La.	—
Lead, (Plumbum,)	Pb.	104
Lithium,	L.	8
Magnesium,	Mg.	12
Manganese,	Mn.	28
Mercury, (Hydrargyrum,)	Hg.	Phillips, 202 Graham, 101.43
Molybdenum,	Mo.	48
Nickel,	Ni.	28
Nitrogen or Azote,	N.	14
Osmium,	Os.	100
Oxygen,	O.	8
Palladium,	Pd.	54
Phosphorus,	P.	Phillips, 16 Graham, 31.44
Platinum,	Pl.	98
Potassium, (Kalium,)	K.	40
Rhodium,	R.	52
Selenium,	Se.	40
Silicium or } Silicon, }	Si.	Phillips, 8 Graham, 22.22
Silver, (Argentum,)	Ag.	108
Sodium, (Natrium,)	Na.	24
Strontium,	Sr.	44
Sulphur,	S.	16
Tellurium,	Te.	Phillips, 32 Graham, 64.25
Thorium,	Th.	60
Tin, (Stannum,)	Sn.	58
Titanium,	Ti.	24
Tungsten, (Wolfram,)	W.	100
Uranium,	U.	217
Vanadium,	V.	68
Yttrium,	Y.	32
Zinc,	Zn.	32
Zirconium,	Zr.	Phillips, 32 Graham, 33.67

THE SOLUBILITY OF SALTS.

Name of Salt.	Sp. Gr.	Solubility in 100 parts Water. at 60°	Solubility in 100 parts Water. at Boiling point.	Solubility in 100 parts Alcohol. at 60°	Solubility in 100 parts Alcohol. at Boiling point.
ALUMINA.	3.9 to 3.97				
Acetate of	1.245	Undetermined			
Arseniate of	....	Insoluble			
Borate of	....	Uncrystallizable			
Camphorate of	....	0.05			
Lactate of	....	Uncrystallizable			
Muriate of	....	Very soluble		100 at 54½°	
Nitrate of	1.645	Very soluble			100
Oxalate of	....	Uncrystallizable			2.91
Phosphate of	....	Insoluble			
Seleniate of	....	Insoluble			
Sulphate of	....	50			
Sulphate of, and Potash	1.71	5.4	133.33		
Sulphate of, and Soda	1.6	100			
Sulphite of	....	Insoluble			
Tartrate of	....	Uncrystallizable		291	
Tartrate of, and Potash	....	Uncrystallizable			
Tungstate of	....	Insoluble			
Urate and Lithate of	....	Insoluble			
AMMONIA.					
Acetate of	....	Very soluble		Readily soluble	
Arseniate of	....	Soluble			
Binarseniate of	....	Soluble			
Arsenite of	....	Uncrystallizable			
Benzoate of	....	Soluble			
Boletate of	....	38			
Borate of	....	8½			0.416
Camphorate of	....	1	33		
Carbonate of (Sesqui)	....	33 (*Ure*)			
	....	20 (*Brande*)			
Chlorate of	....	Very soluble			
Chromate of	....	Very soluble			
Citrate of	....	Difficultly crystallizable			
Ferrocyanide of	....	Very soluble			
Formate of	....	Soluble			
Hydriodate of (or Iodide of Ammonium)	....	Very soluble			
Hydrocyanate of	....	Soluble			
Hydrosulphuret of	....	Very deliquescent			
Hypophosphite of	....	Soluble and deliquescent			
Hyposulphite of	....	Very soluble			
Iodate of	....	Sparingly soluble			
Lactate of	....	Uncrystallizable			
Meconate of	....	66			
Molybdate of	....	Soluble			
Muriate of (or Chloride of Ammonium)	1.52	36	100	7.5 at 80° 4.75 do 1.5 do Sp.gr.of spirits .900 .872 .834	7
Nitrate of	1.58	50	100		19.16
Oxalate of	1.582	4.5	40.84		
Phosphate of	1.8	25 (*Brande*)			
Biphosphate of	....	Less soluble			
Phosphite of	....	Very soluble			
Purpurate of	....	0066	much more		
Pyrolithate of	....	Soluble			

SHOW COLORS FOR DRUGGISTS' SHOP WINDOWS.

BLUE.

No. 1.—Sulphate of copper ℥j, sulphuric acid ℥ss, water ℥x.

No. 2.—Ammonio-sulphate of copper, ammonio-nitrate of nickel (see No. 5) and water.

No. 3.—Prussian blue gr. x, oxalic acid, gr. xx, water ℥xvj.

No. 4.—Dissolve nickel in diluted sulphuric acid, add ammonia in excess, and dilute with water.

No. 5.—Dissolve nickel in diluted nitric acid, add ammonia in excess, and dilute with water.

No. 6.—To the green color made by formula No. 8 under that color, add sufficient aqua ammonia to make it blue.

No. 7.—Dissolve sulphate of indigo in water.

GREEN.

No. 1.—Sulphate of copper ℥ij, chloride of sodium ℥iv, water ℥xx.

No. 2.—Dissolve ℥j of nickel in ℥vj of nitric acid, and add Ov of water.

No. 3.—Dissolve nickel in dilute sulphuric acid, and dilute with water.

No. 4.—Dissolve sulphate of copper in water, and add bichromate of potassa until the required color is produced.

No. 5.—Dissolve ammonio-sulphate of copper in water, and add bichromate of potassa until the required color is produced.

No. 6.—Dissolve sulphate of copper in water, and add nitric acid until the required color is produced.

No. 7.—Dissolve distilled verdigris with acetic acid, and dilute with water.

No. 8.—Dissolve a copper cent in nitric acid, and add enough of the solution to water or proof-spirit to give it the right shade.

No. 9.—Add distilled water and sulphate of copper to a strong decoction of turmeric.

LILAC.

No. 1.—Dissolve zaffre (impure oxide of cobalt) in hydrochloric acid, filter and add carbonate of ammonia in excess; to this add ammonio-sulphate of copper until the required color is produced.

No. 2.—Dissolve zaffre in hydrochloric acid, filter, and add carbonate of ammonia in excess; to this add ammonio-nitrate of nickel (see *Blue*, No. 5) until the required tint is produced.

ORANGE.

No. 1.—Dissolve bichromate of potassa in water until the required tint is produced.

No. 2.—The same as the last, but adding some oil of vitriol, or hydrochloric acid.

PINK.

No. 1.—Dissolve ℥ij of zaffre in ℥vj of hydrochloric acid, filter, add solution of carbonate of ammonia in excess; then add f℥j of liquor potassæ, and dilute with water to produce the required color.

No. 2.—Nitrate of cobalt may be used, with carbonate of ammonia, in the same way as the last.

PURPLE.

No. 1.—Sulphate of copper ℥j, carbonate of ammonia ℥jss, water Oijss.

No. 2.—The last color, with a small quantity of the *Pink* No. 1.

No. 3.—Dissolve permanganate of potassa in water.

No. 4.—Dissolve verdigris two drachms, and aqua-ammonia four fluidounces, in a pint and a half of water.

No. 5.—Acetate of lead one ounce, powdered cochineal one scruple, water a sufficient quantity, until the required tint is produced.

YELLOW.

No. 1.—Bichromate of potassa ʒvj, carbonate of potassa ʒiv, water ℥xvj.

No. 2.—Add a sufficient quantity of tincture of iodine to alcohol or proof-spirit to make a bright straw-color.

No. 3.—Dissolve iron in hydrochloric acid, and dilute with water.

No. 4.—Dissolve Indian-yellow in water.

No. 5.—Pour boiling water on powdered turmeric, and filter. A small quantity of any alkaline solution converts it into a *brown* color.

VIOLET.

Ammonio-sulphate of copper, diluted with water, and enough of the pink color No. 1 to produce the required tint.

RED.

No. 1.—Macerate powdered cochineal in spirit of hartshorn, and dilute it with water.

No. 2.—Dissolve carmine in solution of ammonia, and dilute it with water.

No. 3.—Wash the best madder two or three times with cold water, then macerate it in solution of carbonate of ammonia, filter the solution, and dilute it with water.

No. 4.—Dissolve madder lake in solution of carbonate of ammonia.

No. 5.—Add a sufficient quantity of tincture of iodine to alcohol or proof-spirit, to produce the desired color. Should it fade renew the color by adding more tincture of iodine.

No. 6.—Dissolve carmine in water to which a little chloride of tin has been added.

No. 7.—To a solution of sal ammoniac add a sufficient quantity of cochineal.

No. 8.—Boil a red beet in water, dilute it to the required tint, and brighten it with a little acetic acid.

N. B.—Alcohol answers better for colors than water or proof-spirit, as there is seldom any precipitate or decomposition; beside, as it does not freeze in winter, there is no breaking of the show-bottles, which is apt to ensue when water is used.

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ERRATUM.—On page 25, line 28, for "*Through animal charcoal*," read "*Through wood charcoal*."

Page 302, line 20, for "the *bark of the root*," read "*the bark*."

LEARN THAT TRUTH IS IN ALL, is as omnipresent in human knowledge as the great God of Truth is in his creation. Thus would the student be trained to be a true Eclectic, and seek for the truth in every system and every theory. He would find it in Allopathic, Homeopathic or Hydropathic systems, in bio-chemical, dinamical or histological theories.---*Forbes' British and Foreign Medical Review.*

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